

FRIDAY, AUGUST 15, 1902.

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## Contributions

## The Scherzer Rolling Lift Bridges in Chicago.

The Scherzer Rolling Lift Bridge Co.,  
1616 Monadnock Block, Chicago, Aug. 9, 1902.  
TO THE EDITOR OF THE RAILROAD GAZETTE:

In answer to the letter of Mr. John Ericson, City Engineer of Chicago, published in the *Railroad Gazette* of Aug. 8, 1902, page 617, we beg leave to state:

1. We are compelled to deny the untrue and damaging reports circulated by Mr. Ericson.

2. For every dollar which we have ever received from the citizens of Chicago we have saved them more than five dollars in the cost of the bridges furnished, over the cost of Ericson bridges of equal size.

3. The eight-track Scherzer bridge at Campbell avenue is the largest movable bridge in the world, and the C. T. T. R. bridge is the longest span movable bridge ever built. In view of these facts and the fact that we furnished large surety bonds guaranteeing the successful operation of these bridges, our compensation is very moderate.

4. Our plans and specifications are as complete as they possibly can be; in fact, the plans show every joint and rivet. If such plans can be made for \$700 or less, as stated by Mr. Ericson, then this cost would amount to less than one-tenth of 1 per cent. of the cost of the eight-track bridge, based upon the cost of this bridge, as stated by Mr. Ericson. This alone demonstrates the absurdity of his statements.

5. The Scherzer bridges for Saginaw, Mich., and Cleveland, Ohio, are much smaller than any of the Scherzer bridges for Chicago mentioned by Mr. Ericson, and it is self-evident that our compensation must be less.

6. By excluding the Scherzer bridge from competing with the Ericson bridge for city bridges, Mr. Ericson more than doubled the cost to the citizens of Chicago of the Clybourn Place bridge, and also the cost of the two additional bridges at Ninety-fifth street and East Division street, which have been under construction for more than two years and are not yet completed.

7. If Mr. Ericson, during his administration as city engineer of Chicago, condemns and prohibits the use of inventions and improvements protected by patents granted by the United States Government, he will keep Chicago lagging at least 17 years behind other modern cities.

8. We have no bridge monopoly. There are many other bascule bridges on the market. We claim superior quality, simplicity and economy for the Scherzer rolling lift bridge; but, according to Mr. Ericson's statements, the Ericson trunnion bridge has a monopoly of the City of Chicago, and the trunnion bascule bridge also has a monopoly of the City of Milwaukee.

9. Mr. Ericson's juggling with figures is most marvelous. He evades mention even of the most essential fact—that the Clybourn Place Ericson bridge provides only a 100-ft. clear channel for navigation, while the clear channel for navigation provided by the Main street Scherzer bridge is 140 ft. wide. This difference alone would make a difference in the cost of a movable bridge of at least 80 per cent.

10. We have never submitted any estimates to Mr.

Ericson. The alleged estimates as given by Mr. Ericson are evidently fabricated and published with the intent to injure our business.

11. Mr. Ericson must be mistaken in stating that the city engineer of the City of Milwaukee has decided in favor of the trunnion bridge exclusively; Mr. Charles J. Poetsch, the City Engineer of the City of Milwaukee, has advertised for competitive designs and bids to be received Sept. 5, 1902, for bascule bridges in general. We cannot believe that he has already decided the competition in favor of the trunnion bridge before receiving the designs and bids which he invites.

THE SCHERZER ROLLING LIFT BRIDGE CO.,  
By ALBERT H. SCHERZER, President.

## A Novel and Important Freight Contract.

President A. B. Stickney, of the Chicago Great Western, has issued to stockholders a circular giving some particulars of a contract which has just been made with the beef shippers. The circular, slightly abridged, reads as follows:

It gives the management pleasure to be able to announce that the company has executed identical contracts with each of the packing companies doing business at Kansas City, St. Joseph, Omaha and Sioux City, by which the packers agree to route over the Chicago Great Western lines at least a certain percentage of the entire output of their plants, at definite rates, for the term of seven years. The rates are a substantial advance over the rates which have heretofore prevailed.

The aggregate revenue which these contracts secure to the Chicago Great Western, on the present volume of business, is estimated to be \$14,000,000, and if the business increases as rapidly in the next seven years as in the past, approximately \$20,000,000.

These contracts cannot be understood without a knowledge of the magnitude of the packing industry. The published report of Swift & Co. gives the amount of its sales last year at the enormous sum of \$220,000,000. Presumably, its chief competitor, Armour & Co., did substantially as much, and it is probably safe to estimate that the aggregate sales of the other packers amounted to enough to make the grand total fully \$700,000,000. More than half of the aggregate business is the output of the plants at the Missouri River cities mentioned, and is affected by the contracts.

Each of these great packing companies employs expert traffic men, who have absolute control of the routing of their transportation. Hence the routing of this vast volume of business has been in the hands of only nine men, who, in emergencies, worked together as one man, and, owing to consolidations which have already taken place and are clearly foreseeable in the near future, the routing hereafter will evidently be in the hands of two experts traffic men at the most, and possibly in the hands of one.

The narrowness of the margin of profits is even more surprising than the magnitude of the transactions. The report of Swift & Co. (the only report available) gives the information that on sales during last year, practically in a retail way, aggregating over \$220,000,000 of perishable commodities requiring the greatest care to guard against serious loss, the entire profits were only about \$3,000,000, or less than 1½ per cent. With such a narrow margin of profit, it is easy to see that freight rates are an important factor in the packing house business. It is estimated that the annual freight bills amount to three times the annual profits. Hence, any increase in the rates, which have been established for years, to which the whole business has been adjusted, is a serious matter, and when the increase is as much as 50 per cent. at one jump, it obliterates the entire margin of profits for the time being, and until business is readjusted, which certainly cannot be done in a day or short time.

The Interstate Commerce law requires that tariffs shall be printed and published. Upon the advent of the law [1887], the railroad companies published such tariffs, but the rates named in these tariffs were much higher than any which had ever been paid. . . . The packers, by "shopping" between the different railroad lines, and offering a larger share of their traffic to one line in consideration of a reduced rate, soon succeeded in establishing approximately their former, or even lower, rates, and, in addition, obtained rebates on the business done during the few months before mentioned in which the tariff rates were collected. . . . When the whole of a shipper's business goes to one or two lines, the other lines begin to inquire the reason. The packing company's agent always claims that it is because he is getting better rates. The negotiations have usually ended in a "maximum rate contract."

In a "maximum rate contract" the packing-house company agrees to route a large volume of business, but the railroad company agrees to accept any lower rate which any other company shall offer. These are conditions under which the actual rates were made down to last March when the United States court issued an injunction against the payment of rebates.

During all the years the modus operandi has been to bill packing-house products at the tariff rates and collect the full amount of such rates, afterwards paying back to the packers from 25 to 50 per cent. of the money collected.

Both the payment and receipt of such rebates is unlawful, punishable by fine and imprisonment. The misery of making rates by paying and receiving unlawful rebates, causing the agents of both the paying and receiving com-

panies to live continually in the shadow of the penitentiary, has produced the disposition in both parties to adopt lawful methods in making rates, and the injunction of the United States Court, issued in March, 1902, against the further payment of rebates has furnished the opportunity. . . . No one but the packers themselves knew or could ascertain the average rate they had actually paid. The packers went through their records and reported that the average rate which they had actually paid during more than 15 years between the Missouri River and Chicago was a fraction less than 16 cents.

The railroad companies felt that the average rate had been too low, and the packers expressed a willingness to pay a rate 15 per cent. higher, provided it could be made uniform and stable. An advance of 15 per cent. on the 16 cent rate is 2.4 cents per cwt., a considerable percentage of the packers' net profits, and would make the rate which the packers offered 18.4 cents. Under these conditions the railroad companies met in their Traffic Association to determine upon the rates which they would publish in their tariffs and thereafter collect.

An advance of 15 per cent. in rates means an advance of about 50 per cent. in net earnings. Such an advance would make the poorest railroad rich. An advance of 50 per cent. in the net earnings of the Chicago Great Western would enable it to pay the maximum dividend of 4 per cent. on its preferred B stock.

The conservative judgment of the Association was in favor of accepting the 15 per cent. advance, because it seemed fair to both the packers and the railroads, and would establish a rate which might reasonably be expected to be permanently maintained, while 15 years' experience had conclusively proven that an advance of 50 per cent.—to the 23-cent rate—could not be maintained.

But there was a difficulty in the way. The rate on live-stock was 23 cents, and the Interstate Commerce Commission had made a ruling, based on an imperfect presentation of the facts, to the effect that the rate per cwt. on live-stock should not be higher than the rate per cwt. on packing-house products. Hence, if the rate on packing-house products was made 18½ cents, the rate on live-stock must be reduced, or the ruling of the Commission ignored.

Rather than accept either alternative, a motion was made to make the rate on packing-house products 23 cents, the same as live-stock. At this juncture one of the largest systems was compelled to admit that it had a "maximum rate contract" outstanding, valid until July 1, 1902, guaranteeing a maximum rate of 18½ cents. Under these circumstances, the Association decided to publicly ignore the ruling of the Commission for the three months from March to July, by letting the live-stock rate remain 23 cents, and at the same time making the packing-house product rate 18½ cents, with the understanding that on the expiration of the "maximum rate contracts," July 1, the published rate on packing-house products should be advanced to 23 cents.

The published rate of 23 cents, which is an advance of 50 per cent. above 15 years' actual rates, has therefore been in existence just one month. These rates have been collected for 30 days, and, under the pressure of the injunction, it is probable that no rebates have been paid. But, as in 1887, the packers will probably sooner or later succeed in getting the 50 per cent. advance of the last 30 days made good to them through some kind of ingenious subterfuge circumventing the injunction of the court.

The Chicago Great Western was not in favor of the 23-cent rate, because the railroad companies do not need so large an advance, the packers would not consent to it, and, based on 15 years of experience, it was convinced that a 50 per cent. advance could not be maintained. If attempted, it would induce constant cutting of rates by the lawful method of publishing tariffs.

And, the packers being willing to agree to a permanent substantial advance of more than 15 per cent., the management felt that its duty to its stockholders demanded that it should accept the opportunity to secure, for a term of years, this substantial advance in rates. Accordingly, it has entered into identical and lawful contracts with each and every packer doing business at Kansas City, St. Joseph, Omaha and Sioux City. These contracts are not "maximum rate contracts."

Under the terms of these contracts, the company will publish and put into effect a tariff between the Missouri River and Chicago, covering every article of packing-house products, which it agrees to keep in effect without change of rates for the period of seven years. This tariff is to be a published tariff open to every shipper—to those who have and to those who have not signed the contract alike. The rates which the Chicago Great Western Company has agreed to put into effect on its lines are 20 cents from the Missouri River to Chicago, which is 25 per cent. higher than the average of the last 15 years, and 18½ cents on such products passing through Chicago, which is 15 per cent. higher than the average for the last 15 years. The bulk of the business carries the 20-cent rate, because the bulk of the products of the Missouri River points is shipped to Chicago for further manipulation.

In consideration of this contract on the part of the railroad, the packers agree to ship over the Chicago Great Western lines in each and every month during the full term of seven years, at least a certain percentage of the entire output of their respective packing-houses, and of all such packing-houses as they, their successors and assigns, may hereafter own or control, and to pay therefor the full published tariff rates, regardless of any lower

rates which may be offered by other railroad companies.

This is the price which the packers voluntarily pay for uniform, published rates, which relieves them from the necessity of "shopping" for and accepting unlawful secret rebates.

Thus it will be seen that, while other railroads may lawfully establish lower rates by publishing a tariff, or unlawfully by paying rebates as in the past, a certain agreed percentage of the entire output of packing-house products of every nature and description, is secured to the Chicago Great Western for seven years at tariff rates, or, failing to ship the agreed amount, to make a certain agreed cash payment for each deficiency car, which payment is equal to the estimated net profit to the railroad if the shipment had been made.

These contracts become effective at once as to the business originating at Kansas City and St. Joseph, and become effective as to the business originating at Omaha as soon as the Great Western line, now under construction, is completed to Omaha, and become effective as to the business originating at Sioux City as soon as the Great Western line is completed to Sioux City.

These contracts, unlike the "maximum rate contracts," are legal, and therefore enforceable in the courts.

It is certainly satisfactory to know that so large a volume of gross revenue, approximately \$1,000,000 per annum, is already secured by contract for the Omaha and Sioux City lines now under construction as soon as they are completed.

If the other railroads refuse to ignore the improvident ruling of the Interstate Commerce Commission in regard to live stock rates, the tariff on live stock from Missouri River points to Chicago, of which there are practically no shipments, and the maximum rate on live stock in the intermediate territory to Chicago, will have to be reduced from 23 to 20 cents. This maximum rate, however, only affects a narrow margin of territory east of the Missouri River, in which the live stock mostly goes to Missouri River points, the rate on which would not be affected.

The company considered this contingency before entering into the contracts, and made a careful estimate of the amount of gross revenue, based on the business of last year, it would lose if such a reduction were made, and found that it would amount to less than \$10,000 per annum, or less than \$70,000 during the lifetime of the contract. The company considered it good business to risk the loss of \$70,000 of gross revenue in exchange for \$14,000,000 to \$20,000,000 of gross revenue which would be secured by the contracts.

A. B. STICKNEY, President.

#### Electric Interlocking at Bridge Junction.

The Taylor Signal Company of Buffalo, N. Y., has just finished for the Illinois Central at Bridge Junction, near Cairo, Illinois, an electric interlocking plant with a machine of 23 levers, in which there are a number of features of particular interest, one of the switches being a mile from the cabin.

The situation of Cairo is shown in Fig. 1. The original line from the north approaches the city on the west bank

bound movements of trains over the bridge are governed by a disk signal on or near the bridge, about 1,000 ft. beyond switch 32 at X.

The Taylor system was described in the *Railroad Gazette* Sept. 28, 1900, and July 12, 1901, and is already familiar to the reader, no doubt. Briefly, it consists of

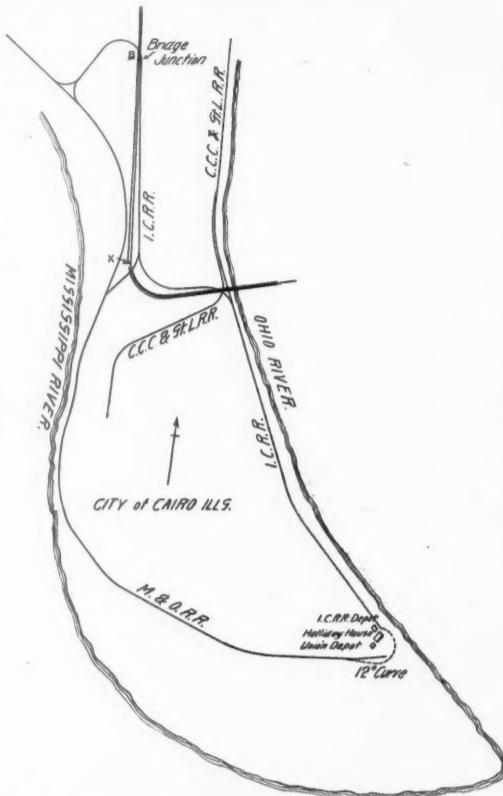


Fig. 1.—Illinois Central and Mobile & Ohio Lines Entering Cairo.

a motor at each switch or signal, to move it, power being derived from a storage battery in the cabin; a machine, consisting of a frame, carrying circuit-controlling slides, which are called "levers"; vertical locking, on the frame, to interlock the levers; circuits to indicate, in the machine, when a switch or signal has completed its movement; rail circuits to serve as detector bars, and wires to connect the various parts. The generator for charging the storage battery is run by a gasoline motor. The power required being small in quantity the generator has to be run only a part of the time. The machine at Bridge Junction has 23 levers and five spare spaces, and the 23 levers perform 30 functions. The new all-electric interlocking takes the place of a mechanical plant of 28

switches. The relay A controls the secondary relay 53; the relay B controls the secondary relay 54, and the relay C controls the secondary relay 55. The secondary relay 53 controls the circuits to switches 3, 5, 5, 14, 14, 21, 16 and 19, and is itself controlled by relay A so that when a train is in any part of the track between battery 52 and signal 20, the branch between signal 4 and switch 5, or between signal 13 and switch 14, the above named switches are locked. The relay 53 also controls the indicator circuits of signals 2 and 13 in such manner that after the signal has been cleared the signal lever cannot be put back normal until the train enters some part of the above named track, although the signal itself can be put normal. Locking the signal lever in this way prevents moving the switches after a route has been set up and the signal cleared. When the train is in the track section the signal lever is released, but then the switches are locked by the relay.

The relay 54 governs the switches 8, 31, 16, 16, 18, 25 and 19, and the signal 30 in the same manner. The relay 55 governs the switches 25, 25, 29, 18 and 19, and the signal 27 in same manner. The facing point switches are so connected with the electric circuits which operate the switches as to be what in mechanical signaling terms would be called bolt-locked. That is to say, the circuit from the cabin to the signal runs through a circuit closer in a switch box, which prevents the operation of the signal unless the switch is in the right position. This precaution is, of course, additional to the ordinary mechanical locking in the machine, and the well-known "indication" by which a signal cannot be cleared until the necessary preliminary switch movement has been actually completed.

The signals at this plant are lighted at night by low candle-power electric incandescent lamps, which use only about 0.8 of an ampere for the 14 lamps, making the cost only about four cents a night for the whole of the signals. By using a storage battery to furnish current for the lights the running of the generator at night is made unnecessary.

The number of trains moving over the bridge daily is about 75, and as switch 32, at the end of the double-track, is usually kept in the normal position (for southbound trains) it is operated for practically every northbound train. It has often been worked 50 times a day.

By the introduction of this power plant the road has dispensed with the services, at these switches, of four men.

#### English Notes.

The most important of the promised August accelerations in England is the new Birmingham to London service in two hours for the 113 miles, thus accomplishing

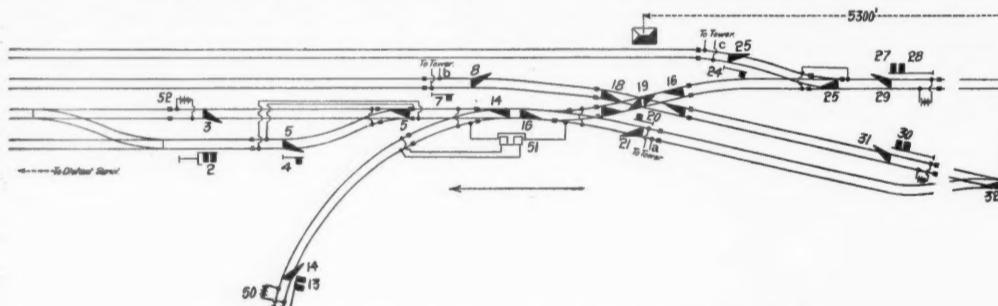


Fig. 3.—Track Locking Circuits at Bridge Junction. (Looking East.)

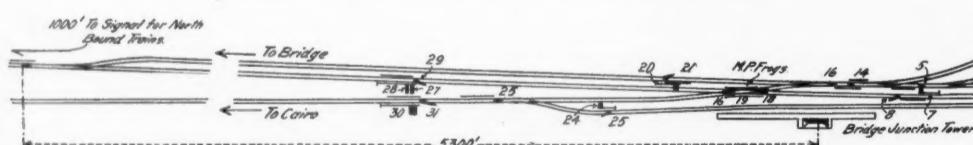


Fig. 2.—Tracks and Signals at Bridge Junction, Illinois; Illinois Central and Mobile & Ohio Railroads. (Looking West.)

of the Ohio River. The road from New Orleans diverges from this line to the right, at the point marked B on the sketch, which is Bridge Junction. The line to the city passes beneath the line to the bridge, as shown. B is also the junction with the Mobile & Ohio. By using this junction and the connecting track at X (beneath the bridge line) both roads are enabled to run their trains into the city by the M. & O. and out by the I. C. By this joint use both companies avoid the necessity of turning the trains or backing them out. The through trains of the Illinois Central from Chicago enter the city by the company's own line, returning to Bridge Junction by the M. & O., and thence on to New Orleans.

Until recently the line from Chicago was double-track as far as Bridge Junction and then single-track to and over the bridge; now the double-track has been extended southward to X, about one mile, and the new switch at the latter point is worked by an electric motor, being controlled by the man in the tower at B, in precisely the same way that he controls the switches nearby. North-

levers, and there is one additional switch. The switch at X required an attendant, of course, until the electric machine was installed.

Fig. 2 is a plan of the tracks at the junction. Trains moving southward on the line to the bridge receive the right to proceed either by signal 2, signal 4, or signal 13. With signals 2 and 13 the distant signals 1 and 12 can be cleared for high speed movements.

By controlling the disk signal on the bridge, which governs the movements of northbound trains, the signalman at Bridge Junction can at all times know when the track is clear, so that he may safely change the position of the switch (32) at the end of the double-track.

The signals are controlled by track circuits. The diagram, Fig. 3, shows the arrangement of these circuits. The battery 50 (Fig. 3) energizes the relay 51 through the rails of M. & O. track between signal 13 and switch 14. A train on any part of this track will shunt relay 51. The relay 51 controls the circuit of battery 52. The battery 52 energizes the relay A in the tower and is gov-

a dream of the last half century. As this is an important competitive point, the Great Western and the London & North Western both giving a non-stopping service of trains, the acceleration is an important move forward. The previous best was two hours, five minutes, by the North Western. The reply of the G. W. to this move is not yet announced, though they will no doubt try to retaliate in some measure in the future, though no further acceleration is contemplated at present by their officials. I am enabled to give the log of the initial trip, as I went down specially to travel on the train.

The train was composed of five bogie coaches and the last compound turned out from Crewe was detailed to make the run. The engine played with the light load, the speed being singularly even up and down hill. Without exceeding 69 m.p.h. once an average speed of 60.3 was comfortably maintained. The finest part of the run was the ascent of a 15 mile grade of 1 in 330 (15.1 ft. per mile) in 15 min. 4 sec., the speed never exceeding 64 or dropping lower than 56 m.p.h.

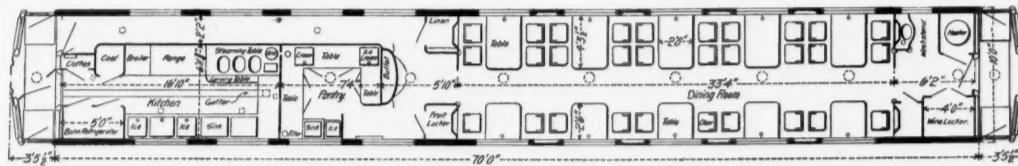
The booked time was 120 min.; the actual time, 115 min., 35 sec.; signal delays, 3 min.; net time, 112 min., 35 sec.; rate, 60.3 m.p.h. for 113 miles.

I had an opportunity to make a run in the new Darlington to York train of the North Eastern, booked at 61.7 m.p.h. The engine was No. 1,869, one of the two built at Gateshead in 1895 and '96 especially to haul the trains on the resumption of racing after 1895, which never took place. They have 7 ft. 7 1/4 in. coupled drivers, leading bogie and cylinders 20 x 26, with about 1,200 sq. ft. of heating surface. They are the largest coupled drivers in use regularly in any country so far as I know. The load was seven cars weighing 143 tons. The net time from platform end to platform end was 39 1/2 minutes or a speed of 66.8 m.p.h., the maximum speed was 74.75 m.p.h., which was maintained for some distance. This may be taken as a fair sample of the daily running of the train.

R. HOPE.

#### Large Dining Cars for the Chicago, Milwaukee & St. Paul.

What are probably the two largest dining cars ever built were recently completed by the Barney & Smith Car Co. for the Chicago Milwaukee & St. Paul and are now in service on the "Pioneer Limited" trains of



Plan of Dining Car—C. M. & St. P.

that road. As will be seen from the plan of these cars, they are 70 ft. over end sills, and 77 ft. 11 in. over all. They are 10 ft. wide over side sills, making them 4 in. wider and 6 in. higher from floor to ceiling than the standard palace car. These increased dimensions add considerably to the roomy effect of the interior and to the comfort of the passengers. Thirty-six people may be seated at the tables at one time.

In exterior finish and design these cars correspond to the other cars of the "Pioneer Limited." The dining room is finished in old St. Jago mahogany, natural finish. The color scheme, a blue, soft in tone, and harmonizing most agreeably with the rich color of the mahogany, has been carefully worked out, from the carpets to the headlinings, including the leather upholstery of the chairs, the window valances and shades. The headlinings are ornamented by a geometrical design in gold, and all metal fittings and light fixtures are in antique bronze. Designs of the wood-work are executed in marquetry, eliminating heavy carving, which is difficult to keep clean.

The deck is an improved Empire design having twin arches and pilasters extending down between the windows to the tables. Each pair of pilasters has an alcove between, decorated in marquetry and backed by triple-bevel plate-glass mirrors. The windows are very large, having double plate-glass with counter-balanced sashes. At one end of the car is an elaborate side-board of solid mahogany, seen in the engraving. The front is circular with clear glass doors above, having ornamental metal framing, and across the central portion is a large bevel plate-glass mirror.

The cars are lighted by electricity, there being six three-light electroliers in the deck and a single bracket light over each table. Current for these lights may be supplied from a dynamo in the baggage car or from a storage battery carried beneath the car. The heaters are an improved fire-proof type of steel, and can be fired direct, or used in conjunction with steam from the locomotive, or operated from the latter source alone.

The kitchen is unusually large and will accommodate six cooks. It is fitted with an extra-size range and large boiler, and each car is provided with a wine and a fruit locker, both of which are in the main room, and a refrigerator for meat and vegetables in the kitchen. All three refrigerators are of the Bohn system and their

combined ice capacity has been made double that of the usual dining car.

Special provision has been made to prevent the kitchen odors from passing into the dining room. The entrance to the kitchen is through a partition set at an angle across the platform, the location being such that a large window in the end of the vestibule opens directly in front of the kitchen door. By suitable arrangement of the ventilation all odors are carried out through this door and window.

#### American Railway Association.\*

Secretary W. F. Allen has just issued the Proceedings of this association at the meeting of April 23 and 24, and it makes a volume of over 500 pages and more than an inch thick.

The proceedings proper, covering more than a whole day's discussion of the per diem question, fill 40 pages, and anyone who wishes to read some interesting statements of the troubles of the New England roads and the sharp comments thereon by western men, will find them here.

The appendices contain the new train rules for double-track; the train rules for single track, revised to conform to the double-track rules; the report of the committee on safety appliances, as to the practice of different roads

number of signals and the number of switches; and these are classified under (1) grade crossings or draw bridges, (2) at terminals, (3) at intermediate points; and each road specifies whether mechanical, electro-pneumatic, low pressure pneumatic, etc. The total number of plants on the roads reporting is 2,228, with 39,994 levers; there are 24,057 signals, not including block signals, and 16,413 switches. In these totals are comprised the following: Mechanical interlocking, 2,121 plants, 36,792 levers, 21,497 signals, 14,000 switches; electro-pneumatic, 64 plants, 1,721 levers, 1,649 signals, 1,581 switches; electric, 18 plants, 493 levers, 289 signals, 204 switches; low-pressure pneumatic, 13 plants, 676 levers, 407 signals, 443 switches; other kinds, 12 plants, 302 levers, 215 signals, 176 switches.

The highest number of levers that we notice in the report of any one road is on the Pennsylvania, 4,956, of which 766 are electro-pneumatic. The New York Central reports 4,485, including 74 electro-pneumatic and 544 low-pressure pneumatic.

Forty-four roads favor the use of a green light for the night clear signal, and 20 state that they do not favor it. Where green is used for clear yellow is favored for the distant signal at night by 35 roads, and the combination of green and red is favored by 10, including a number of prominent Chicago roads. Thirty-three roads did not reply to this question. The Grand Trunk favors red for the night distant signal. A number of important roads give affirmative answers to the question whether some of the adjuncts should be made requisites, and all of the important adjuncts are thus favored by some. A few important roads favor the use of electric locking rather than detector bars at crossings and junctions.

The questions concerning block systems were answered by 53 roads. The total number of miles of road signaled is 24,900, of which 17,350 is single track. The number of semaphore signals, not including yard interlocking, is 14,966, of which only about 3,000 are distant. A table is given showing the number of block sections on each road, with maximum and minimum lengths of sections. A number of roads report maximum lengths of over 10 miles, not to mention two which report 33.6 and 34.7 respectively. As this last is under the head of automatic signaling it is apparent that the question was misunderstood, or the figures are misprinted. The signal reports, both interlocking and block, are supplemented by diagrams with the arms and disks colored red, green, yellow, etc. Under the head of interlocking there are 44 diagrams of semaphores and 13 of dwarf semaphores; and under block signaling there are 65 figures of semaphores and disks.

#### Electric Traction on the North Eastern (England).

The electrification of our steam railroads has been the subject of discussion for several years, and references to the loss of passenger traffic due to the competition of suburban tramways are becoming common features of railroad meetings. The pinch has been still more keenly felt in America, where the speeds of tramways are so much higher, and the distances which they extend beyond the towns so much greater than in this country.

Even under the most favorable conditions, it is doubtful if the economy effected by electrification will be sufficient to give an immediate return upon any very heavy capital expenditure. Engineers and railroad officials have for some time past been awakening to these facts, but hitherto the practical outcome has been nothing. The directors of the North Eastern Railway Company, who, as our readers are aware, are an eminently progressive body, have, however, now decided to electrically equip their suburban lines in the neighborhood of Newcastle.

The lines which the North Eastern Railway Company is proposing to electrify serve a district with a dense industrial population, and lie to the north of the Tyne between Newcastle and the sea. The total length of line to be equipped in the first instance is some 37 miles, mostly double track, and although the actual details have not yet been decided upon, we may say the scheme for which the directors are inviting tenders is a third-rail one. As far as the passenger traffic is concerned, it will be worked on the multiple unit system. It is proposed that a normal train should consist of two motor coaches and one trailer coach, the carriages being probably of the vestibule type. With this arrangement the length of trains can, of course, be increased should the traffic requirements need it. Electric locomotives will, possibly, be provided for goods traffic, though this, we understand, is not yet settled.

It is intended to take current from the Newcastle-upon-Tyne Electric Supply Company, which is at present supplying current at a lower rate than any other company in the kingdom, and it is interesting to note that this great system (the successful career of which we dealt with some time ago), which already supplies electrical energy for such varied uses as lighting, tramways and shipyards, is now to have still another class of consumer. The scheme, if fully carried out, will probably involve an expenditure of some £200,000 by the railroad company, and of a much larger sum by the supply company.

The results to be expected from this conversion to electrical operation are in the direction of retaining and probably increasing the present traffic, rather than in greater economy of working, though it is believed that the expenditure will be somewhat reduced. The scheduled speed it is proposed to raise to 22 miles per hour, including stops.



Interior of Dining Car—Chicago, Milwaukee & St. Paul.

In the matter of examination of employees, an abstract is given of the replies of 128 roads (filling 140 pages) to questions concerning education, age, physical condition, eyesight, etc. Thirty-three roads state that they do not examine employees as to color perception. We find only one large road among these 33, and that one intends to examine.

#### Interlocking and Signaling.

Concerning interlocking plants, replies were received from 84 roads. The questions relate chiefly to the requisites of the American Railway Association, the roads being asked to say whether their practice does or does not comply with these requisites. The statistics show the number of interlocking plants, the number of levers, the

\*The April meeting was reported in the *Railroad Gazette* of May 2, page 235. Copies of the official report can be had of Secretary Allen, 24 Park Place, at \$2 each.

Mr. Gibb and the expert who is advising him have, it is well known, for some years past been making a very careful study of all that has been done both here and in other countries in connection with the subject and we have little doubt that this will be the pioneer of numerous other similar schemes.—*The Statist.*

#### New Blast Furnaces Building on June 30.

On June 30 there were 28 new blast furnaces under construction in the United States, located in 11 States, namely, 4 in New York, 1 in New Jersey, 11 in Pennsylvania, 1 in Virginia, 1 in West Virginia, 1 in Tennessee, 2 in Alabama, 2 in Ohio, 1 in Illinois, 2 in Michigan, and 2 in Colorado. When completed 24 of these furnaces will make pig iron with coke, two with anthracite coal and coke mixed, and two with charcoal. Below will be found a list of the furnaces and the points at which they were being erected. Furnaces being rebuilt, or furnaces building on the site of old furnaces, are not included in this list.

Lackawanna Steel Company, Buffalo, N. Y. Four coke furnaces at West Seneca, below Buffalo.

Joseph Wharton, Wharton, N. J. One anthracite and coke furnace at Wharton, N. J.

New Jersey Zinc Company (of Pennsylvania), South Bethlehem, Pa. One anthracite and coke furnace at Palmerton, Carbon County, Pa.

Carnegie Steel Company, Carnegie Building, Pittsburgh. One coke furnace at Rankin and two coke furnaces at Bessemer, Pa.

Clairton Steel Company, Frick Building, Pittsburgh. Three coke furnaces at Clairton, Allegheny County, Pa.

Sharon Steel Company, Sharon, Pa. One coke furnace at Sharon.

Rochester & Pittsburgh Coal & Iron Company, Du Bois, Pa. One coke furnace at Falls Creek, Clearfield County, near Du Bois.

Union Steel Company, Frick Building, Pittsburgh. Two coke furnaces at Donora, Washington County, Pa.

Big Stone Gap Iron Company, Big Stone Gap, Va. One coke furnace at Big Stone Gap.

Tube Steel Company, Conestoga Building, Pittsburgh. One coke furnace at Benwood, W. Va.

Dover Iron Company, Bear Spring, Tenn. One charcoal furnace near Bear Spring.

Central Iron & Coal Company, Tuscaloosa, Ala. One coke furnace at Tuscaloosa.

Alabama Consolidated Coal & Iron Company, Birmingham, Ala. One coke furnace at Gadsden, Ala.

The Cleveland Furnace Company, Perry-Payne Building, Cleveland, Ohio. One coke furnace at Cleveland.

Toledo Furnace Company, Toledo, Ohio. One coke furnace at Toledo.

South Chicago Furnace Company, Rookery Building, Chicago. One coke furnace at South Chicago, Ill.

Pioneer Iron Company, Mercantile Bank Building, Cleveland, Ohio. One charcoal furnace at Marquette, Mich.

Detroit Iron & Steel Company, Detroit, Mich. One coke furnace on Zug Island, near Detroit.

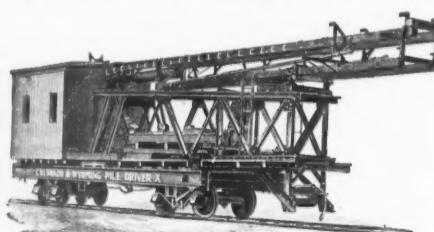
Colorado Fuel & Iron Company, Denver, Colo. Two coke furnaces at Pueblo.

In addition to the above the Buffalo & Susquehanna Iron Company broke ground for two new coke furnaces at Buffalo, N. Y., on July 26.—*The Bulletin.*

#### An Improved Car Pile Driver.

An improved design of pile driver has recently been built for the Colorado & Wyoming by the Vulcan Iron Works, Chicago, styled a "double-end" by the builders. It is capable of driving bents 20 ft. ahead, 12 ft. 8 in. to the rear, and 27 ft. 2 in. to the side, measured from the center of the track. This driver differs in several respects from other designs in use, particularly in the length of the leaders, the design and mounting of the superstructure and the method of swinging the leaders for batter driving.

The leaders, or live leaders, as they are called on this design, are 40 ft. high, are made of wood lined with channel iron, and are designed to be raised either by hand or by power from the engine. They are supported near the top by false leaders, which may be seen in the en-



graving situated under and parallel to the live leaders; the trunnions on which the leaders are swung to the vertical position being attached to the former. The point of the support of the live leaders is also the center around which they are swung for batter driving, and being near the top, the arc through which the latter moves is relatively small. There is, therefore, little opportunity for displacement of the ropes or cables passing over the top sheaves.

The superstructure is made entirely of structural steel and is mounted on a turntable of regular bridge form, the roller-treads being of wrought steel and machine finished. The centers, both top and bottom, are made very heavy, and from the live center radial rods pass to a retaining-ring placed outside of the treads, each rod having a conical roller on the outer end, just inside the retaining-ring. Most of the weight is carried on the center and the construction is such as to enable easy swiveling, it being possible to turn the superstructure with one hand.

The swinging appliance is placed at the forward end of the car and consists of a rack and steel pinions, operated by bevel gears driven from a cross shaft. Weights under the rear end of the superstructure counterbalance the weight of the leaders and hammer.

The body of the car is formed of structural steel and is 36 ft. long by 10 ft. wide. The side sills are 15-in. I-beams and the center and intermediate sills are 10-in. I-beams fastened together with riveted diaphragms. The forward truck may be moved back when it is desired to take advantage of the full forward reach of the machine. The trucks are also of steel, having diamond frames and cast-steel bolsters and transoms. An additional body bolster is provided, for use when the front truck is moved back. The special equipment of the car includes McCord journal boxes, National hollow brake-beams on the rear truck only, Christie brake-shoes, and Gould couplers and draft irons; the draft timbers are continuous. The engine is a double 7 x 10-in. and the boiler an upright 42 x 96-in. The drop hammer weighs 2,800 lbs., and an adjunct which is furnished by the company with all drop hammers is the Casgrain patent pile cap which serves two purposes; it acts as a toggle, and forms an excellent substitute for the usual pile bands. The weight of the pile driver complete is 73,500 lbs.

#### An Electro-Hydraulic Analogy.

A familiar way to simplify the comprehension of certain electric terms and phenomena is to point out the analogy between a direct current and the flow of water in a pipe. In this case the pressure producing flow is likened to the *voltage* or electromotive force and the quantity of water passing through the pipe to the *amperage* or amount of current. The initial pressure is gradually consumed in overcoming resistance in the pipe or conductor, and in strict analogy the losses in either case are

stances counter waves are sent out which greatly complicate the action of the circuit as a whole. Prof. Eddy has carried this analogy out with some detail. In all cases, however, the comparisons show that the elasticity, inertia and friction in an hydraulic circuit co-operate in the same manner as capacity inductance and resistance in an electric circuit.

These analogies do not attempt to explain the fundamental principles underlying the theory of alternating currents, and the mistake must not be made in applying these analogies to confuse cause and effect.

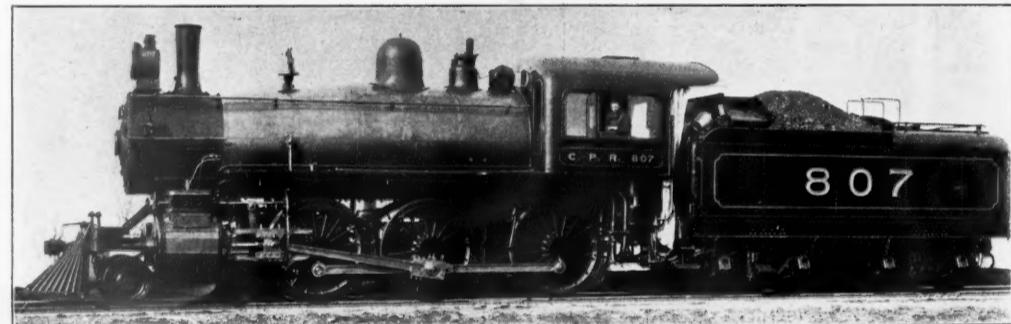
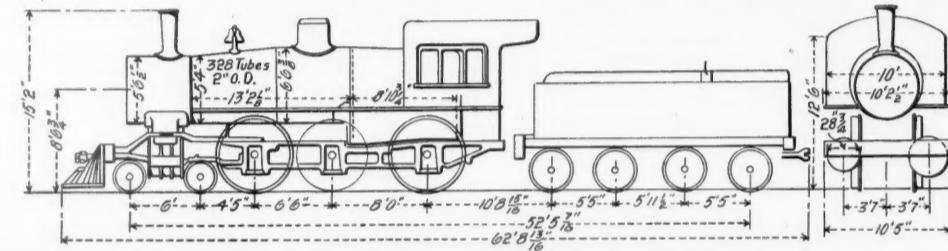
#### Compound Passenger Locomotive for the Canadian Pacific.

We illustrate herewith a compound 10-wheel passenger locomotive built for the Canadian Pacific at their shops in Montreal and designed by Mr. E. A. Williams, Superintendent of rolling stock. There are 24 of these locomotives now building, and they will be used in trans-continental service.

The engines have a very trim appearance. There is but little piping to be seen, and the lines of the cab and tank are good. The sand box is circular and fits around the boiler shell beneath the covering.

The eccentrics are cast-steel and the eccentric straps have bronze liners. The absence of the main air reservoir is noticeable. These have been placed between the frames of the tender. A wind shield, in the form of a small glass shutter, fastened to the central window of the cab, shelters the engineer or fireman when looking out. A number of years ago this same device was employed by some roads. A mirror was set in the shutter so that the train could be seen without looking backward.

The engines have cylinders 22 in. and 33 in. in diameter with 26 in. stroke. The drivers are 69 in. in diameter on the tread—the main drivers being unflanged. The



Compound Ten-Wheel Passenger Locomotive for the Canadian Pacific.

proportional to the square of the current and the first power of the resistance.

This analogy has been carried a step further by H. T. Eddy in a recent paper,\* and applied to the phenomena of alternating current transmission. He assumes a double acting pump cylinder and piston in which the two ends of the cylinder are connected by a long pipe or by-pass without valves. When this apparatus is filled with water and the piston is moved by a uniformly rotating crank, the water flows alternately back and forth from one end of the cylinder to the other. It will be quite evident that at the beginning of the stroke the pressure will be greatest, for at this point the pump cylinder has to overcome the inertia of the moving mass of water and change its direction of flow. The maximum current occurs when the piston is near the middle of the stroke for at a point near the middle the piston velocity is a maximum. In other words, the maximum current lags one-quarter of a revolution behind the maximum pressure, and when the pressure is a maximum the current is a minimum, and vice versa. This is precisely the action of an alternating current due to the *inductance* of the circuit.

If now the connecting pipe be made of some elastic material, the effect of each impulse will be to distend the pipe and send a wave along its entire length. If the pipe be of sufficient length a number of waves may be present simultaneously. By a moment's consideration it will be seen that the distension of the pipe tends to neutralize or diminish the inertia effect of the water; in other words, the capacity of the system is enlarged. This is analogous to *capacity* in an alternating electric circuit, the effect being to assist each reversal of current.

By assuming a receiving pump at the other end of the system it is possible to compare the resultant effects with those obtained in the case of an alternating circuit delivering power to a distance motor. Under such circum-

stances counter waves are sent out which greatly complicate the action of the circuit as a whole. Prof. Eddy has carried this analogy out with some detail. In all cases, however, the comparisons show that the elasticity, inertia and friction in an hydraulic circuit co-operate in the same manner as capacity inductance and resistance in an electric circuit.

These analogies do not attempt to explain the fundamental principles underlying the theory of alternating currents, and the mistake must not be made in applying these analogies to confuse cause and effect.

#### Description.

Weight on drivers ..... 126,125 lbs.  
Weight on truck wheels ..... 39,350 lbs.  
Weight, total ..... 165,475 lbs.  
Weight tender loaded ..... 126,600 lbs.

#### General Dimensions.

Wheel base, total, of engine ..... 24 ft. 11 in.  
Wheel base, driving ..... 14 ft. 6 in.  
Wheel base, total (engine and tender) ..... 52 ft. 5 1/2 in.  
Heating surface, fire-box ..... 152.6 sq. ft.  
Heating surface, tubes ..... 2,262.9 sq. ft.  
Heating surface, total ..... 2,415.5 sq. ft.

#### Wheels and Journals.

Drivers, number ..... 6  
Drivers, diameter ..... 69 in.  
Drivers, material of centers ..... Cast steel  
Journals, driving axle, size ..... 9 x 12 in.  
Journals, truck axle, size ..... 6 x 10 in.  
Main crank pin, size ..... 6 1/2 x 6 in.

#### Cylinders.

Cylinders, diameter ..... 22 in. and 33 in.  
Piston, stroke ..... 26 in.

#### Boiler.

Boiler, type of ..... Extended wagon top  
Boiler, working steam pressure ..... 210 lbs.  
Boiler, diameter of barrel at waist ..... 34 in.  
Thickness of tube sheets ..... 1/2 in.  
Thickness of crown sheet ..... 9/16 in.  
Crown sheet stayed with ..... Radial stays

#### Fire-box.

Fire-box, length ..... 8 ft. 10 1/2 in.  
Fire-box, width ..... 3 ft. 5 1/2 in.  
Fire-box, water space, width. Front, 4 in.; sides, 3 1/2 in.; back, 3 in.

#### Tubes.

Tubes, number ..... 328  
Tubes, outside diameter ..... 2 in.  
Tubes, length over sheets ..... 13 ft. 2 1/2 in.

#### Tender.

Tank capacity for water ..... 6,000 gal.  
Coal capacity ..... 10 tons  
Kind of material in tank ..... Steel  
Type of underframe ..... Steel  
Type of truck ..... Metal  
Diameter of truck wheels ..... 40 in.

\*Paper read at the Pittsburgh Meeting of the Am. Association for the Advancement of Science.

## A Review by Decades of American Deep-Water Steamers in the Atlantic Coastwise Service.

BY RAY MORRIS.

WITH AN INSET.

A detailed history of American coastwise shipping during the 50 years or so of its existence, would require a large volume. Furthermore, it may perhaps be said that its value would not compensate its length, since it would be concerned with an infinite number of complications, the effect of which would be to confuse the reader, and obscure the actual lines of progress and change. The purpose of this article is to show graphically the tendencies of traffic and of design in the history of American coastwise steamers on the Atlantic. Every tenth year has been singled out to illustrate, briefly and in a general way, the tendencies of the decade, and the month of

boats for Chagres, one and the same ship performing both of these functions. They were representative of the highest type of coastwise design of their day, and cleared with their cabins crowded with passengers, who paid \$315 for transport to San Francisco, the prevailing rate via clipper ship varying from \$200 to \$250. They were all paddle steamers, and the "Georgia," which was the largest, was of 2,727 tons, built in 1849 by Smith & Durion, New York.

There were two lines which cleared ships for Charleston in March, 1852. Spofford & Tiletson first appear in this decade, operating the steamers "Union," "Marion," "James Adger" and "Southerner." The "Adger" was a propeller; the others were side-wheel, and the "Union," 1,200 tons, built in 1850 by Wm. H. Webb, New York, was the largest. The "Adger" was also built by Webb in '52, and was of 1,151 tons burthen. She did not clear during March, however. Wardle's South Carolina Line also cleared the steamer "South Carolina" for Charleston once during the period chosen. The "South Carolina" was a paddle boat of 1,304 tons, built in New York the year previous by Jabez Williams.

There were also two steam lines to Norfolk. Mailler & Lord, who operated other lines from New York to Boston and Philadelphia, cleared two small propellers, the "City of Norfolk" and the "City of Richmond," of 572 and 444 tons, respectively. The New York & Virginia S. S. Co. also operated the first steamer "Roanoke," 1,071 tons, illustrated as typical of the period. The "Roanoke" was built at Westervelt's yard, New York, in 1851, and frequently made the run from

representatives of the period chosen. The "Chesapeake" was a wooden propeller of 496 tons, built at Philadelphia in 1863, and was subsequently bought by Cromwell's Portland agents, and operated by them, after he had withdrawn his service. The "Saxon," which is still running between Philadelphia and Providence, and was launched early in '62, was of 1,293 tons; very fine boat for the period.

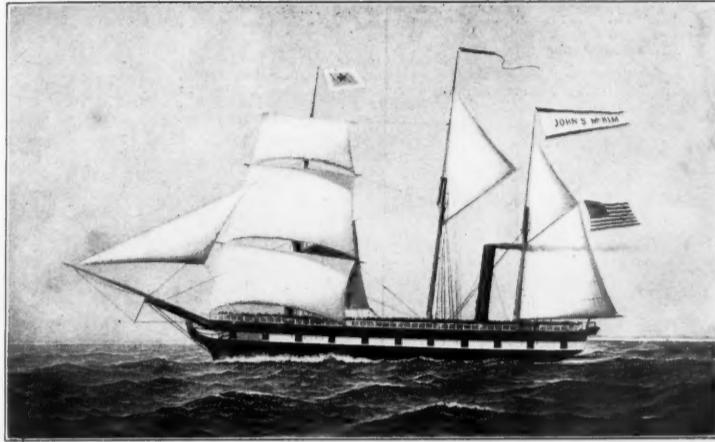
Several of the accompanying illustrations, however, show the general progress of coastwise marine architecture in the sixties. The "Morro Castle," one of the best boats on the coast, ran to Havana and elsewhere, on Spofford, Tiletson & Co.'s line. She was a paddle steamer of 1,680 tons, built at New York in 1864, with an oak hull. The "Bienville," of Livingston & Fox's line, was a wooden vessel of 1,468 tons, built at Williamsburgh, in 1860. The "Quaker City" ran during the latter sixties on the "Regular" line to Charleston, Leary, agent. She had previously been in off-shore service, and was built in 1854.

## 1872.

The 1872 decade is of unusual interest because of the number of lines engaged, and because of the activity of the competition and the high freight and ensuing profit. The prevailing boats were small, but there were 23 coastwise lines out of New York, exclusive of a large number of services by smaller steamers, not of the deep-water type. The small steamers from Philadelphia, for example, going by way of the canals averaged four or five in number each day. Of the deep-water boats, 117 cleared coastwise during March. In a word, this was the closing decade when it was profitable to run small steamers and to compete with the railroads for passenger and mail traffic. A comparison with 1882 shows that at that time there were 14 lines only, and 109 clearances, but in 1872 the railroad connections were not particularly good, and railroad time was not particularly fast. The ports were the centers of industry, and fine ships were driven to their best performance with large passenger and mail traffic, besides remunerative freight. The accompanying table shows the lines of the period, and casual survey of the figures shows that the paddle and screw steamers were equally common, with a prevailing tonnage of 1,500 or less, and 10 or 12 knots as the maximum speed. The majority of the hulls were built of wood at shipyards scattered throughout the New England States, as well as at New York, Philadelphia and Wilmington. The screw steamers were equipped almost universally with a single, direct-acting engine, and, as a rule, with one boiler. It was a period of competition rather than of consolidation, and a period when the traffic was profitable in spite of wasteful engines and small hulls.

## 1882.

The next decade shows radical changes in type, management, and the general nature of the service, and of competition. The year 1882 and the general period of the early eighties followed times when there had been great railroad expansion and considerable business depression. The whole conditions of the service had changed since the decade previous. The mails were now carried by land; freights were low, and the coasting steamers carried passengers who traveled by sea rather on account of special reasons, such as lower rate of



Clyde's John S. McKim, Built in 1844.

March has been arbitrarily chosen as the unit, within the year, for purposes of consideration. Since, ordinarily, the life of a ship considerably exceeds any one ten year period, the changes which occur in a given decade indicate the increasing and changing needs of the traffic, rather than merely the replacement of worn out hulls with new ones.

It is difficult, in many cases, to draw the line between deep-water and inland boats. Ferguson & Wood's little New Bedford boats, which ran in 1872, would, for example, be excluded from present-day lists as not conforming to the deep-water type, and the fine side-wheel steamers of the Boston and Bangor Line, which not only have an outside run, but can stand rough treatment, are excluded for this reason. Standards of construction have changed so greatly, however, that it was considered necessary to include the New Bedford boats in the tables for 1872. In order to get the subject within the space limitations, it has also been necessary to exclude what are known as the "off-shore" boats, to Havana, Panama, etc., except for occasional mention for purposes of reference.

## 1842.

In March, 1842, there were no steamers making regular outside runs on the Atlantic coast. During the month, the "R. M. S. Clyde" arrived at New York from Halifax, and proceeded to Charleston, Nassau, Savannah and Havana, but this was an isolated trip, and the "Clyde" was the only deep-water steamer which entered New York harbor during that period, although the Cunard Line, between Liverpool and Boston, was advertising its inaugural runs. The lists of vessels arriving and clearing at New York in 1852, however, 10 years later, show, besides the steam transatlantic mail routes, a well-organized coastwise service, with eight lines in regular operation, as is indicated in the table. The illustration of the "John S. McKim" will serve as a general type for the forties.

## 1852.

During March, 1852, the second period chosen, the great rush to California following the discoveries of gold was at its height. Exclusive of sailing vessels, there were 10 lines of steamers which ran down the coast and continued to the Isthmus, making connections across either at Chagres or at San Juan de Nicaragua. Similar lines on the Pacific side conveyed the passengers and freight to San Francisco. In some cases, however, the ships rounded the Cape and succeeded, in spite of the great length of the journey, in filling their cabins at each departure. Commodore Vanderbilt undertook the last of his sea ventures at this time. Exclusive of his interest in the Pacific Mail Line, there were two lines of steamers which bore his name, one of which ran a single ship to Chagres, and the other, of which D. B. Allen was agent, cleared during the month three ships for San Juan de Nicaragua. Fifteen steamers cleared during this month with San Francisco traffic, the most favored Isthmus port on the Atlantic side being Chagres. The famous Pacific Mail Line, which is in operation at the present day, first appeared in this decade—Roberts, agent—with the steamers "Crescent City," "Empire City," "El Dorado" and "Georgia," for March clearances. As a rule, these ships touched at Havana, New Orleans, or both, and hence linked themselves to the coastwise service proper. It is rather curious to note that they were advertised under two heads; as "United States Mail S. S. Co." boats for New Orleans, and as "Pacific Mail"

Norfolk in 23 hours; but little slower than its successors on the Old Dominion Line in the eighties.

There were three steam lines to Philadelphia at this period; Thompson's, Mailler & Lord's, and Sanford's Independent Line. The latter cleared the "Delaware" and the "Kennebec," of 616 and 480 tons, respectively, and was the most important; the others operating single ships, which ran irregularly. Mailler & Lord's Boston Line, with the steamer "Ontario," concludes the list of coasters of 1852 which made New York a port.

It is interesting to note that the different coastwise lines on the Atlantic which have not made New York their port, may be safely excluded in compiling an article of this sort. With a few exceptions, which will be noted hereafter, they have been of very slight importance, from the first foundations of the traffic until the present time, and the New York steamers have been foremost in size, speed and design. The following table shows the names of the steamers clearing coastwise during March, 1852, together with their type and gross tons, and the total gross tonnage cleared and number of departures from

New York during the month are also included.

It will be seen that no attempt is made to compare the entire fleets during the different decades represented, but merely the ships which cleared in the single month. The table shows that the United States Mail Steamship Company operated the largest ships of the decade, which ran from New York to another American port on the Atlantic and, in fact, the "Georgia," 2,727 tons, was larger than some of the smaller coasting steamers of the present day.

## 1862.

During the month of March, 1862, taken to complete the chronological order of the periods, the coastwise service was practically nonexistent, owing to the blockading of the southern ports and the employment of the steamers in Government service. There were no lines at all, in fact, which cleared steamers to the southern ports, although the Pacific Mail, Allen's Aspinwall, and Ludlow & Heineken's Havana lines continued running. Cromwell's line from New York to Portland was also in operation during this period, with the steamer "Chesapeake," and there were small steamers between New York and Boston, Philadelphia, Providence, Trenton and Baltimore. But the practical suspension of all coasting business is shown by the fact that there were five arrivals and six clearances during the month, and of the seven steamers represented, all except the "Chesapeake" cleared for Panama, Aspinwall or Havana. The Boston & Philadelphia S. S. Co. was, however, in operation, with the "Saxon," and therefore the "Chesapeake" and the "Saxon" must stand as the sole repre-

## MARCH, 1852.

Steamers cleared from New York.	Type.	Gross tons.	Total gross tons cleared during March.	No. of departures from New York.
NEW YORK AND BOSTON : Mail & Lord's Line.....	Ontario†			
NEW YORK AND PHILADELPHIA : (Outside.) Independent Line.....	Kennebec.....Wood, p. w. Delaware.....Wood, p. w.	480 { 616 {	2,328	4
NEW YORK AND NORFOLK : New York & Virginia S. S. Co.... Mail & Lord's Line.....	Roanoke.....Wood, p. w. (City of Norfolk).....Wood, p. w. (City of Richmond).....Wood, sew.	1,071 { 572 { 444 {	5,355	5
NEW YORK AND CHARLESTON :				
Spofford-Tiletson's Line.....	(Union).....Wood, p. w. (Marion).....Wood, p. w. (South).....Wood, p. w.	1,200 { 900 { 1,304 {	8,280	8
Wardle's Line.....	South Carolina.....Wood, p. w.	960 {	1,304	1
NEW YORK AND SAVANNAH :				
Mitchell's Line.....	Alabama.....Wood, p. w. Florida.....Wood, p. w.	1,051 { 816 {	4,550	5
NEW YORK AND NEW ORLEANS :				
U. S. Mail S. S. Co. to New Orleans, via Havana.....	Empire City.....Wood, p. w. Georgia.....Wood, p. w. (Philadelphia).....Wood, p. w.	1,751 { 2,727 { 1,238 {	5,716	3
†Did not clear during March.	*No records.			

passage, etc., than because it was the quickest and most feasible method of transportation. To make traffic pay under these conditions, it became necessary to reduce ton-mile cost by increasing carrying capacity and by getting the maximum efficiency out of the coal burned. Hence the prevailing coastwise type was the boat of increased size, with an iron hull, propeller and compound engines. Roach, the Cramps, and Harlan & Hollingsworth built practically every steamer on the coast at this time, in consequence of which the general types were very similar.

The following table of the number of ships and number of lines which cleared them, in each decade period, shows quite clearly the change in the early eighties, by the fact that the gross tonnage cleared during the month was nearly 40,000 tons more than in March, 1872, in spite of the fact that eight fewer ships cleared, and the figures showing the number of lines in operation point out the fact that it was no longer profitable to maintain more or less haphazard services without due regard for all pos-

MARCH, 1872.

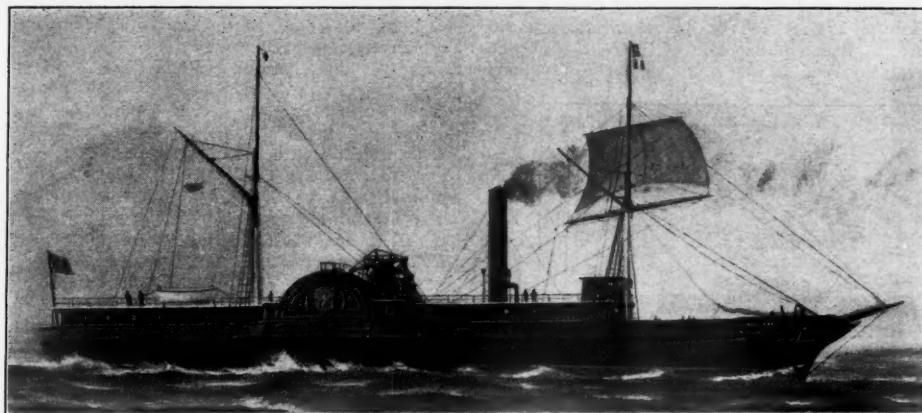
	Steamers cleared from New York during March.	Type.	Gross tons.	Total gross tons cleared during March.	No. of departures from New York.
NEW YORK AND PORTLAND:					
Maine S. S. Co.	Franconia	Wood, scw.	674	3,510	6
	Chesapeake	Wood, scw.	496		
NEW YORK AND NEW BEDFORD:					
Ferguson & Wood	Wamsutta	Wood, scw.	328	978	3
	Acushnet	Wood, scw.	325		
NEW YORK AND SALEM:					
Murphy & Ferris	Norwich	Wood, scw.	367	1,193	3
	Alliance	Iron, scw.	413		
NEW YORK AND BOSTON:					
Metropolitan	Glaucus	Wood, scw.	1,849		
	Nereus	Wood, scw.	1,849	22,185	12
Mallory	Neptune	Wood, scw.	1,848	418	1
	Tillie	Wood, scw.	418		
NEW YORK AND PHILADELPHIA:					
Lorillard's	Benefactor	Iron, scw.	844		
	Fanita	Iron, scw.	432	6,684	10
	Volunteer	Iron, scw.	611		
NEW YORK AND WASHINGTON- ALEXANDRIA:					
Merchants' Line	E. C. Knight	Wood, scw.	421	1,809	3
	John Gibson	Wood, scw.	444		
NEW YORK AND NEWBERN, N. C.:					
Murray & Ferris	Zodiac	Wood, scw.	606	1,920	4
	Ellen S. Terry	Iron, scw.	354		
NEW YORK AND NORFOLK:					
Old Dominion Line	Wyanoke	Iron, p. w.	2,067		
	Isaac Bell	Wood, p. w.	1,612	17,004	12
	Albemarle	Wood, p. w.	871		
	Wm. P. Clyde	Wood, scw.	504	3,833	7
	G. B. Upton	Wood, scw.	607		
NEW YORK AND CHARLESTON:					
Morgan Line	Georgia	Iron, p. w.	1,900		
	South Carolina	Iron, p. w.	1,650		
	Champion	Iron, p. w.	1,452	19,204	13
	Manhattan	Wood, p. w.	1,338		
	Charleston	Wood, p. w.	1,227		
	James Adger	Wood, p. w.	1,085		
NEW YORK AND SAVANNAH:					
Murray & Ferris	Leo	Wood, scw.	924		
	Virgo	Wood, scw.	1,143		
	General Barnes	Wood, scw.	1,205		
	Herman Livingston	Wood, p. w.	943	17,481	17
Lowden	Montgomery	Wood, scw.	1,100		
	Huntsville	Wood, scw.	825		
Garrison	Magnolia	Wood, p. w.	1,068		
	San Salvador	Wood, p. w.	971		
NEW YORK AND BRUNSWICK AND FERNANDINA:					
Hand's Line	Mercedita	Wood, scw.	856	3,234	4
	Ashland	Wood, scw.	761		
NEW YORK AND NEW ORLEANS:					
Cromwell Line	Cortes	Wood, scw.	1,246		
	St. Louis	Iron, scw.	1,062	4,276	4
	Geo. Washington	Wood, scw.	989		
	Geo. Cromwell	Wood, scw.	979		
	Western Metropo				
	Is	Wood, p. w.	2,092		
Merchants' Line (Baker)	United States	Wood, scw.	1,180		
	General Meade	Iron, scw.	1,103	6,127	5
	Sherman	Iron, scw.	973		
	Emily B. Sonder	Wood, scw.	779		
	City of Galveston	Wood, scw.	1,253		
Southern Line (Mallory)	Equator	Wood, scw.	1,044	4,315	4
	Victor	Wood, scw.	1,327		
	Gen'l Sedgwick	Wood, scw.	691		
NEW YORK AND GALVESTON:					
Texas Line	City of Houston	Iron, scw.	1,253		
	Clyde	Iron, scw.	1,182	4,122	4
	Wilmington	Iron, scw.	895		
	Arladine	Wood, scw.	792		

MARCH, 1882.

	Steamers cleared from New York during March.	Type.	Gross tons.	Total gross tons cleared.	No. of departures from New York.
NEW YORK AND PORTLAND, ME.:					
Maine S. S. Co.	Eleanora	Wood, scw.	988	7,640	9
	Franconia	Wood, scw.	675		
NEW YORK AND BOSTON:					
Metropolitan Line	Neptune	Wood, scw.	1,848	24,032	13
	Glaucus	Wood, scw.	1,849		
	Gen. Whitney	Wood, scw.	1,849		
NEW YORK AND BALTIMORE:					
Merchants & Miners' Transporta- tion Co.	Wm. Kennedy	Wood, scw.	975		
	McClellan	Wood, scw.	983	9,084	9
	Blackstone	Wood, scw.	1,147		
NEW YORK AND GEORGETOWN, D. C.:					
Clyde Line	E. C. Knight	Wood, scw.	421	1,730	4
	John Gibson	Wood, scw.	444		
NEW YORK AND NORFOLK:					
Old Dominion	Richmond	Iron, scw.	1,438		
	Manhattan	Iron, scw.	1,525		
	Breakwater	Iron, scw.	1,043	40,728	26
	Wyanoke	Iron, p. w.	2,067		
	Old Dominion	Iron, p. w.	2,228		
NEW YORK AND WILMINGTON, N. C.:					
Clyde	Benefactor	Iron, scw.	844		
	Regulator	Iron, scw.	847	6,376	7
	Gulf Stream	Iron, scw.	908		
NEW YORK AND CHARLESTON:					
Quintard's Line	City of Atlanta	Wood, scw.	1,621		
	City of Columbia	Wood, scw.	1,878	20,290	12
	Santo Domingo	Wood, scw.	1,642		
	Morro Castle	Wood, scw.	1,714		
	Delaware	Wood, scw.	1,646		
NEW YORK AND SAVANNAH:					
Ocean S. S. Co.	City of Macon	Iron, scw.	2,093		
	City of Columbus	Iron, scw.	1,992		
	City of Augusta	Iron, scw.	2,870	19,060	9
	City of Savannah	Iron, scw.	2,029		
	Gulf City	Iron, scw.	1,997		
NEW YORK AND NEW ORLEANS:					
Cromwell Line	Louisiana	Iron, scw.	2,849		
	Hudson	Iron, scw.	1,564	7,541	4
	New Orleans	Iron, scw.	1,564		
	Algiers	Iron, scw.	2,294		
	Chalmette	Iron, scw.	3,205	10,383	4
	New York	Iron, scw.	2,590		
NEW YORK AND GALVESTON:					
Mallory Line	San Marcos	Iron, scw.	2,839		
	Rio Grande	Iron, scw.	2,556	10,999	4
	Colorado	Iron, scw.	2,765		
NEW YORK AND PORT ROYAL- FERNANDINA:					
Mallory Line	City of San Antonio	Iron, scw.	1,605	9,795	6
	State of Texas	Iron, scw.	1,736		
	Carondelet	Wood, scw.	1,508		
NEW YORK AND JACKSONVILLE:					
Warren Ray	Louis Buck	Wood, scw.	417	417	1
Van Brunt	John E. Stevens	Wood, scw.	417		
*No records.					

MARCH, 1892.

	Steamers cleared from New York during March.	Type.	Gross tons.	Total gross tons cleared.	No. of departures from New York.
NEW YORK AND PORTLAND:					
Maine S. S. Co.	Manhattan	Wood, scw.	1,892		
	Cottage City	Wood, scw.	1,885	16,096	9
	Eleanora	Wood, scw.	988		
NEW YORK AND BOSTON:					
Metropolitan Line	Herman Winter	Iron, scw.	2,626		
	H. F. Dimock	Iron, scw.	2,626	34,462	13
	H. M. Whitney	Iron, scw.	2,707		
NEW YORK AND NORFOLK:					
Old Dominion Line	Seneca	Iron, scw.	2,729		
	Roanoke	Iron, scw.	2,354		
	Guyandotte	Iron, scw.	2,351		
	City of Atlanta	Wood, scw.	1,236	62,507	31
	Wyanoke	Iron, p. w.	2,067		
	Old Dominion	Iron, p. w.	2,223		
	Richmond	Iron, scw.	1,438		
NEW YORK AND WILMINGTON, N. C., AND GEORGETOWN, S. C.:					
Clyde Line	Pawnee	Wood, scw.	1,210	3,444	3
	Croatan	Steel, scw.	1,024		
NEW YORK AND CHARLESTON:					
Clyde Line	Algonquin	Iron, scw.	2,833		
	Iroquois	Iron, scw.	2,944		
	Cherokee	Iron, scw.	2,557	36,433	14
	Seminole	Iron, scw.	2,557		
	Yemassee	Wood, scw.	1,880		
NEW YORK AND SAVANNAH:					
	Kansas City	Iron, scw.	3,679		
	City of Birmingham	Iron, scw.	3,066		
	City of Augusta	Iron, scw.	2,870	49,878	17
	Nacoochee	Iron, scw.	2,680		
	Tallahassee	Iron, scw.	2,677		
NEW YORK AND BRUNSWICK:					
Mallory Line	Rio Grande	Iron, scw.	2,556	8,584	4
	State of Texas	Iron, scw.	1,736		
NEW YORK AND FERNANDINA- ST. AUGUSTINE:					
Warren Ray	City of St. Augustine	Wood, scw.	564	564	1
NEW YORK AND JACKSONVILLE:					
Merchants' S. S. Co. of Florida, Somerville, Agt.	J. G. Christopher	Wood, scw.	1,039	2,078	2
NEW YORK AND NEW ORLEANS:					
Cromwell Line	Louisiana	Iron, scw.	2,849		
	Hudson	Iron, scw.	1,564	9,105	5
	Knickerbocker	Iron, scw.	1,564		
	New Orleans	Iron, scw.	1,564		
	El Paso	Iron, scw.	3,531		
	El Mar	Iron, scw.	3,531		
	El Dorado	Iron, scw.	3,531		
	El Sol	Iron, scw.	4,572	35,432	10
	Excelsior	Iron, scw.	3,264		
	Chalmette	Iron, scw.	3,205		
NEW YORK AND GALVESTON:					
Mallory Line	Concho	Iron, scw.	3,724		
	Alamo	Iron, scw.	2,943		
	Comal	Iron, scw.	2,935	27,722	9
	Nueces	Iron, scw.	3,367		
	Colorado	Iron, scw.	2,765		
	San Marcos	Iron, scw.	2,839		
NEW YORK AND 1902.					
Steamers cleared from New York during March.					
NEW YORK AND PORTLAND:					
Maine S. S. Co.	North Star	Iron, scw.	3,200		
	Horatio Hall	Iron, scw.	3,168	28,044	10



Roanoke, 1851—1,071 Tons. N. Y. &amp; Virginia S. S. Co.

sible economy, in the face of the competition. The results of this decade in the coasting traffic seem almost to have anticipated the present demand for greater cargoes and fewer carriers in the transatlantic service.

*Coastwise Steamship Traffic Out of New York*

Month of March:	No. of clearances.	No. of lines.	Total gross tons cleared from New York.
1842	1	1	29,565
1852	30	8	496
1862	1	1	496
1872	117	23	120,747
1882	109	14	168,664
1892	118	12	285,741
1902	148	14	414,537

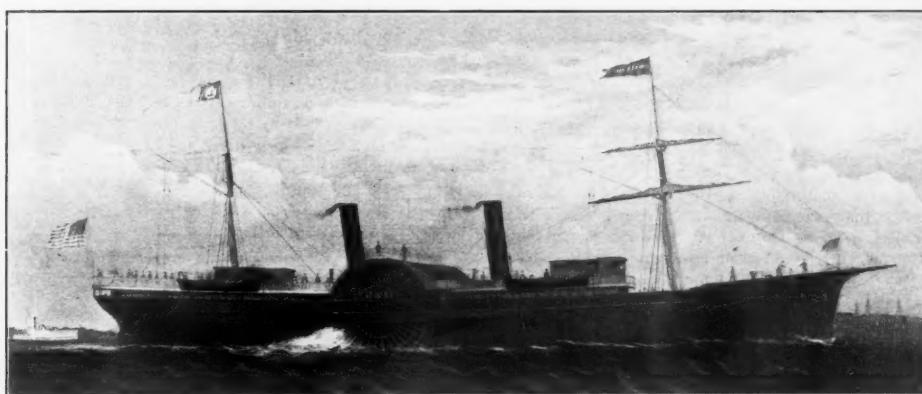
It is perhaps well to remark in connection with the figures shown that there is no known way of obtaining absolute tonnage or statistics throughout the different periods considered. Lloyd's Register has been followed as far back as practicable, but 15 years ago it was the exception rather than the rule to find the rating of an American coasting ship in Lloyd's. Hence before that, the American Record, corresponding in general to Lloyd's, was followed, but the American Record was founded in 1868, and for the years before that the only available figures were those deposited with the United States Commissioner of Navigation as each ship was built. These were kindly furnished by the present Commissioner, and are undoubtedly very accurate, but it is obvious that there are likely to be slight differences in methods of measuring gross tonnage. The figures may safely be considered close, however, and are certainly as close as can be obtained.

As will be seen from the list of ships, the best boat running coastwise in 1882 was the "Chalmette," of the Morgan Line. The "Chalmette," an iron screw steamer

New Orleans ..... 1,905<sup>†</sup> ..... 1,530 2,881 3,531 4,757  
Portland ..... 496<sup>\*</sup> 704 831<sup>§</sup> 1,888<sup>§</sup> 3,123<sup>§</sup>  
Boston ..... 1,849 1,849 2,653 2,680

Av'ge of six ports. 1,273 ..... 1,408 1,929 2,755 3,620

\*Str. "Chesapeake"; no others running. <sup>†</sup>These boats touched at New Orleans and continued to off-shore ports. <sup>§</sup>Two ships only. <sup>‡</sup>Including "City of Memphis," not in commission during March.



Quaker City, 1854—1,143 Tons.

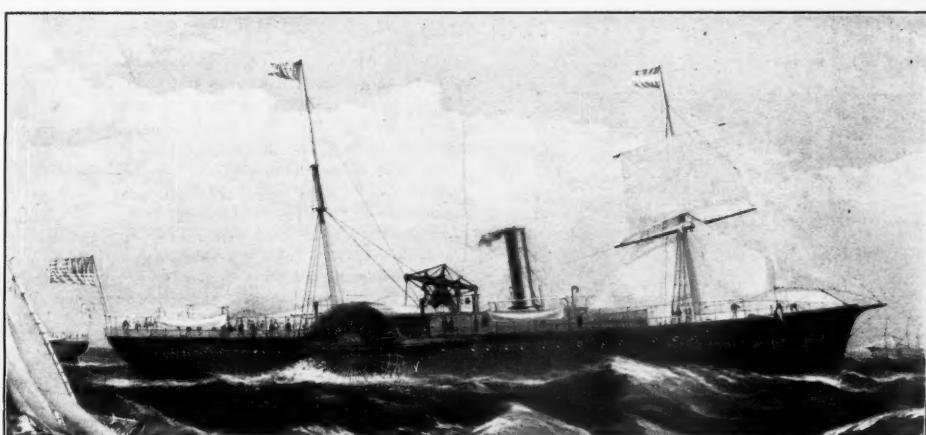
The table on the page opposite, in uniform form with that of the other decades, shows the tonnage clearances in 1892. The Morgan Line to New Orleans, mentioned as having the largest ship (the "Chalmette") in 1882, is seen

Ocean S. S. Co. of Savannah, better known as the "Savannah Line."

The first triple expansion engines built in the United States for a large vessel in the merchant service were put in the "Iroquois," Clyde Line, in 1886. Hence mention of them is proper in connection with this decade, but, like compound engines 10 years earlier, they were only found in a few of the best boats, in 1892, and are by no means universal at the present time, although it is fair to reckon them as the standard type of high class construction.

1902.

At the present time, the tendency to increase size and carrying capacity is marked. Speed and passenger traffic are considerations which have been, in general, steadily decreasing in importance since the days when there was active competition along these lines, but there are important exceptions to this statement. The Morgan boats, for example, carry freight from New Orleans to New York in five days, which is not much different from freight train time, and the Maine S. S. Co. advertises widely its fast passenger service to Portland, through the Sound, and secures a large passenger traffic in the warm months. Similarly, the Old Dominion Line has a good all-the-year business to Norfolk, though the boats are not as fast as would be feasible under modern conditions, because the "rush" traffic must of necessity go by rail, and the steamship company would not be recompensed



Bienville, 1860—1,468 Tons. Livingston &amp; Fox.

of 3,205 tons, was built by the Cramps, in 1879. She is 321 ft. long, and fully as large as the majority of the best boats which were running a decade later.

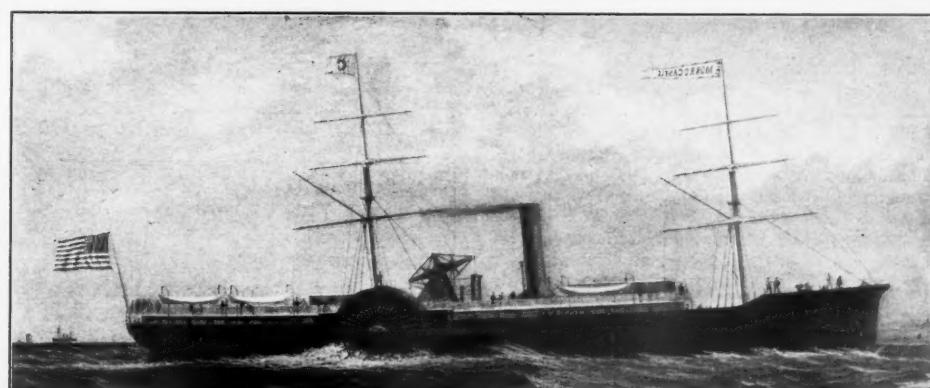
1892.

The next decade, illustrated by March, 1892, shows increased size, the practical disappearance of wooden hulls, prevalence of compound engines, and a gradual working in of steel. The Roach yard at Chester, now the Delaware River Co., was building the majority of ships for the coasting trade at this time, and the first boat built by them with compound engines, specifically intended for the Atlantic deep-water coastwise trade, was the "Rio Grande," in 1876. Harlan & Hollingsworth's first compound engines for the coast were in the "Decatur H. Miller," built in 1879 for the Merchants & Miners Trans. Co. The Cramps put compound engines in the "Geo. W. Clyde" as early as 1871, and these were the first built in this country. But in spite of the fact that these instances all date back to the decade previous, the compound type of engine was not universally found until the close of the eighties, so that it may be fairly included in the list of important advances in construction typified by the decade ending in 1892. The change in size to permit of increased carrying capacity, is clearly shown by the following table, carried to date.

*Average Gross Tonnage of Three Largest Ships.*

New York to	1852.	1862.	1872.	1882.	1892.	1902.
Savannah	1,179	2,330	3,205	4,650 <sup>‡</sup>		
Charleston	1,218	1,667	1,745	2,778	3,400	
Norfolk	696	1,517	1,938	2,478	3,111	

pendently by Mr. Morgan was the "Excelsior," 1882. The Southern Pacific Railroad then became interested in the line, and subsequently leased the property, building all the ships whose names begin with "El." Similarly, the Central of Georgia acquired the securities of the

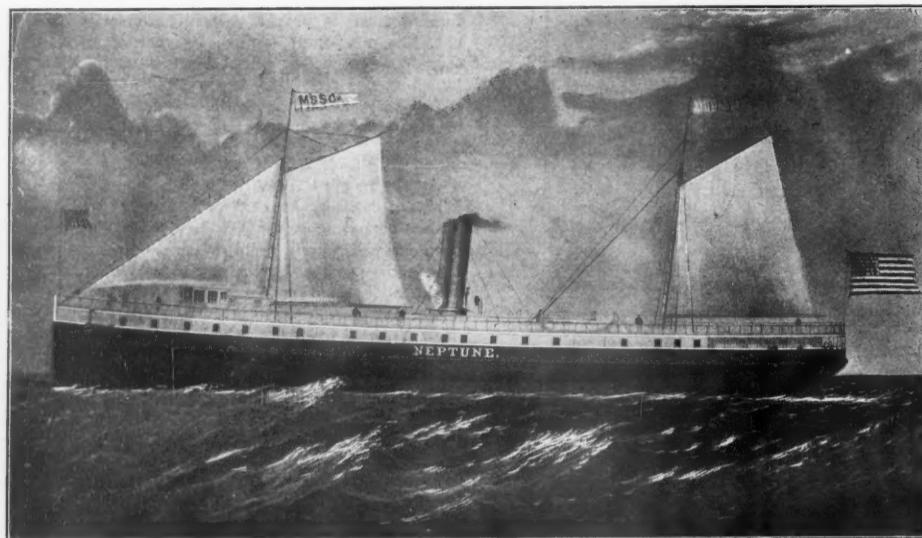


Morro Castle, 1864—1,680 Tons. Spofford-Tileton &amp; Co. Off-Shore Service.

exceptional conditions. Cheap charters are better than none, however, and the effect of the schooner competition is, in a considerable degree, to take the lumber trade away from the steamers, except at two or three ports, such as Savannah and Georgetown, S. C. During April,

1902, the Brunswick Board of Trade reported 9,485,200 superficial feet of lumber, and 7,253,300 superficial feet of railroad ties shipped coastwise on sailing vessels, a total of 20,633,650, as against 3,895,150 ft. by steamer. No

tendencies of the present day. The "City of Memphis" is the nearest analogy to the big, slow transatlantic boats. At the time she was ordered, there was a split in the company, one faction standing for a freighter,



Neptune, 1864—1,848 Tons. Metropolitan Line.

lumber at all was shipped north from Brunswick by rail, since whatever goes that way is sent direct from the mill where it was manufactured. The rates vary greatly and it is impossible to summarize them further than to say that, in general, steamers average about \$1.00 per 1,000 ft. more than sailing vessels. It will be noted that Brunswick is reached by a weekly service of the Mallory Line.

Savannah is a great steam port, and the figures show a large increase in the share of lumber carried by steamers. During 1901, 178,000,000 ft. of lumber were shipped from the port. Of this total, 167,000,000 ft. went coastwise. The sharing of the coastwise portion between steam and sail cannot be obtained from the port statistics, but out of the 178 millions total, 98,000,000 went by sail and 80,000,000 by steam. It is the small ports, all along the coast from Cape Hatteras south, however, which swell the schooner lumber tonnage.

The coal traffic is handled by a different means yet, exclusive of that which comes by rail. Although the schooners depend much on coal charters, a great amount of the traffic is handled in barges, towed in strings of four or five from the railroad terminus at Norfolk or elsewhere to their destination, and brought back light. This is a kind of transportation which, in its scope, seems to be peculiarly American. The British coaster is a collier, par excellence, but the American coaster goes

pure and simple, and the other for a fast passenger boat. The result was a compromise, in the "Memphis," a freighter of large carrying capacity with accommodations on a single deck for a limited number of passengers. She was completed this spring at the Delaware River Works, and is a single screw steamer of 5,252 gross tons; length, 396 ft.; width, 49 ft. beam. It is interesting to observe in the illustration that not only is there no sheer visible, but the decks appear to hog. As a matter of fact, there is a sheer, of a trifle over 30 in., but the eye is so accustomed to seeing more than an illusion is produced. The "Comus," designed by Horace See, and built at the Newport News works, exaggerates the sheer as much as the "Memphis" belittles it. She

tween New York and New Orleans. The new Morgan boats, also designed by Mr. See, and the "Comus" and "Proteus," of the Cromwell Line, are much alike, except that the Cromwell boats have an extra deck for passengers. Their working speed is about 15 knots.

The "North Star" is primarily a passenger carrier, in the warmer months, although there is plenty of room for all the freight that can be obtained. It is perhaps safe to say that she and her sister ship, the "Horatio Hall," maintain the fastest average working speed of any deep-water boats on the American coast, except some of Ward's off-shore boats, approximately 16 knots. The "North Star" was built last year, at the Delaware River works.

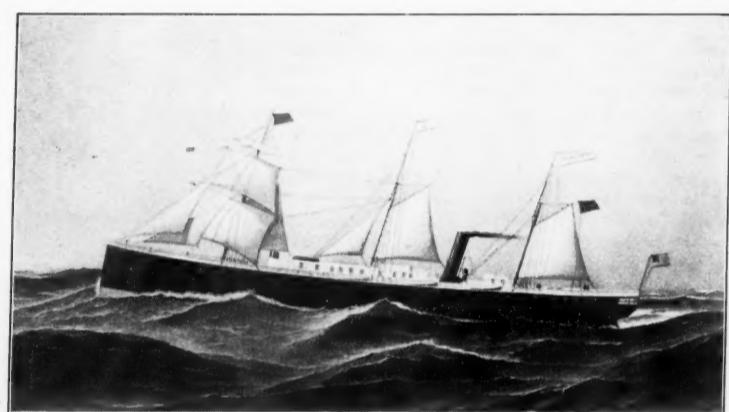
By way of comparison with the fluctuations of coasting steamer traffic, the following table is appended, showing the arrivals at the port of New York of all classes of sailing vessels during a single week of March in each of the decade years chosen. No division between trans-Atlantic and coastwise vessels has been attempted, as the figures are sufficiently eloquent without manipulation, and show the remarkable way in which, in recent years, the steamers of large capacity have competed with sailing freights.

*Sailing Vessels Arrived at New York, Single Week in March.\**

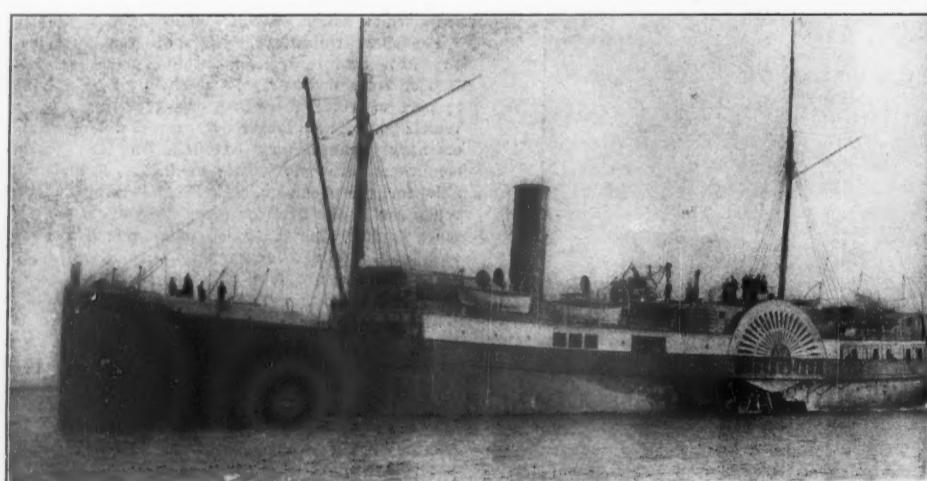
	1842	1852	1862	1872	1882	1892	1902
Ships .....	15	46	33	15	9	19	1
Barks and barkentines .....	0	28	5	43	51	29	4
Brigs and brigantines .....	2	41	5	45	20	11	1
Schooners .....	5	189	32	169	324	291	47
	22	304	75	272	404	350	53

\*There is often considerable difference between different weeks in the same month, owing to the wind, special charters, etc. Therefore, in each case, a representative week, as far as possible, has been selected.

Among the illustrations will be noticed, besides the New York coastwise steamers, several off-shore boats—among them the "Morro Castle" and "Niagara," of the



George W. Clyde, 1872—1,849 Tons. Clyde Line.



Old Dominion, 1872—2,223 Tons. Old Dominion and Joy Lines.

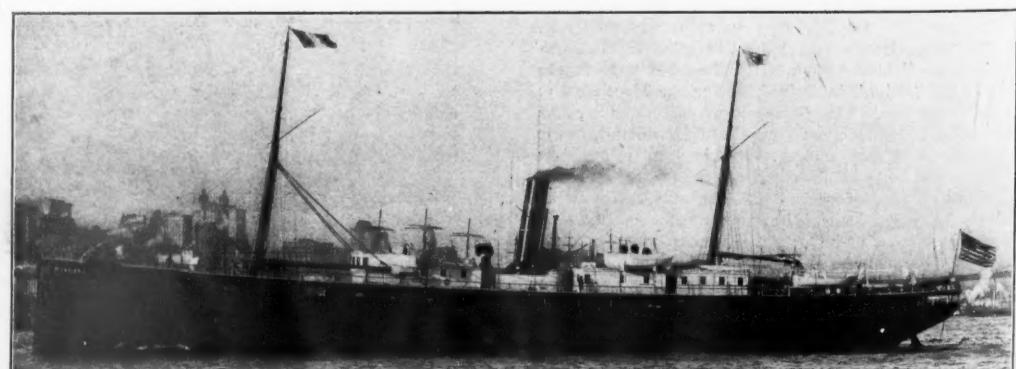
through 20 years of service without transporting a ton of coal, except within her bunkers. The development of the towing industry as a factor in commercial development is too large a subject to be discussed here, but it is sufficient to say that it is an outgrowth of recent years; that ton-mile cost is reduced astonishingly, and that it is another source of confusion to the sorely perplexed schooner owner.

Space does not permit of a comparison between British and American coastwise services, although it would be of great interest in this connection. Suffice it to say that the characteristic British coaster is a boat of 1,000 tons or less, which carries anything, from coal to railroad iron, at a speed of about eight knots, and "tramps" it from Greenock to Birkenhead, and from the Thames to the Tyne. Many, if not most of the boats, are designed with their engines aft, to permit of a single long cargo hold, for railroad iron, etc., instead of two short ones, and with cellular framing so that no particular harm will be done if it is found convenient to lie over low tide on a mud bank, in a tidal harbor.

Of the new boats in the American coastwise service, the "City of Memphis," the "North Star" and the "Comus" are interesting as types, showing three different

represents the type of moderately fast passenger and freight service under railroad management, exemplified also in the Savannah Line, and in the splendid ships (freight only) of the Morgan Line, be-

Ward Line—and two boats which do not touch at New York, the "Kershaw," of the Merchants' & Miners' Transportation Co., and the "Grecian," of the Boston & Philadelphia Line. The history of the off-shore boats, especially, is of great interest, as in the case of the lines to the Isthmus referred to in 1852 decade, and of the ships to Cuba. The Ward Line, which absorbed the old Alexandre Line among others, and now maintains a fast service between New York and Havana, operates the best steamers of the general coastwise type which leave New York, and the "Morro Castle," the largest ship on the line, built at Cramps in 1900, is a twin screw steel vessel of 6,004 tons, 400 ft. long, and of 50 ft. beam. It is interesting to contrast her with the old "Morro Castle," which had the same run, 38 years ago. The "Niagara" is one of the original four steamers with which the present service was inaugurated, and is also shown for purposes of comparison. She is a single screw, iron boat of 2,265 tons gross, and 275 ft. long, and was built at Chester in 1877. The Merchants' & Miners' Transportation Co., represented by the "Kershaw," is one of the lines not touching at New York which deserves special attention, since it has for many years maintained a freight and passenger service between Boston, Providence, Norfolk and Savannah. Ships were also run between Baltimore and New York, outside, in the eighties. The "Kershaw" is a single screw steel steamer of 2,600 tons, built in 1899 at the Harlan & Hollingsworth yard in Wilmington. The Boston & Philadelphia S. S. Co. have six ships in commission, of which the



Niagara, 1877—2,268 Tons. Ward Line. Off-shore Service.

largest is the "Grecian," of 2,827 tons, built also at Harlan & Hollingsworth's in 1900. The "Grecian" is a steel boat 265 ft. long, and is equipped with triple expansion engines.

It is a rather odd fact that the singularly unsuccessful "City of Savannah," formerly "La Grande Duchesse," is the only twin screw coasting steamer out of New York which runs to another American port on the Atlantic. Our coastwise construction has been rather backward in this respect, owing more perhaps to a general spirit of conservatism than to any specific reason or reasons, as the builders, in general, have none to allege except that the familiar single screw type seems to fulfill the demands of the coastwise service, but it is probable that the next decade will show a radical change in this respect, as there are indications of orders for twin screw coasters in the near future. At present, however, the orders for new ships are rather inactive, although the Delaware River people are to build at once a sister ship to the "City of Memphis," for the Savannah Line, and a new boat for the Mallory Line, about the size of the "Denver."

The numerous interesting features of the different lines of the present day must be left chiefly to the imagination of the reader to supply from the tables, as lack of space renders it impossible to enumerate them. Attention, however, may be called to the successful passenger business the Old Dominion Line has built up between New York and Old Point Comfort and Norfolk, and to the large scope of the Clyde Line which, at one time or another, has operated services to a great number of southern ports and maintained a large auxiliary fleet of inland and river boats, besides its deep-water services. Clyde's New York and Philadelphia service has been omitted from the tables, as it is carried on partly by boats using the inside route.

The concluding table, which classifies the ships in commission to the ports of Norfolk, Charleston, Savannah and New Orleans, during each successive month of March, according to the type of their engines and the material of their hulls, shows in brief form the progress which has been made, and fixes by decades the changes in design. The ports chosen as representative show these changes more accurately than a larger list would, since

the ties show the least signs of decay. This action of the rail cannot be avoided if the resisting surfaces at the base of the rail are equal on both sides.

"The rail as now made is symmetrical in cross-section and would be more or less correct if there were no other forces acting upon it than a load upon the top, taking effect at right angles to the base of the rail. The rail, however, is subjected to very frequent blows and pressure against its running side and it should, therefore, be so made, according to our bridge construction theory, that it maintains its intended position to the surface of ties.

"The Compensation tie plate is designed to give the rail more area for support at the outside where loads are greater, and less area at the inside, and the plates, therefore, are placed under the rails with the narrow end next to the center of the track. The appearance of the track with plates so laid at once suggests their purpose. It can readily be seen that when the plate begins to penetrate the tie, and this must happen sooner or later, the resistance to penetration of the wider part is greater than of the narrower, causing the plate to settle more uniformly, thereby maintaining a more perfect parallelism of plate to surface of tie, keeping up gage of track and also preventing the buckling of the plate. The resistance of this plate to penetration of tie at the inside of the rail is purposely reduced, as too much metal there is not only a waste of material but a positive damage to the rail.

"It is furthermore a fact that a tie plate cannot be prevented from moving on the tie when a train is passing over the rail, and teeth, lugs, flanges or whatever is at the bottom of a plate, will soon widen out the space in wood designed to hold them tightly, filling the additional space up with sand and promoting decay of tie. A tie should not be allowed to be cut up more than is necessary to insure additional resistance to spikes and to make the plate to a certain extent an integral part of the tie. The Compensation tie plate has a trapezoidal form and the relative widths of its ends have been determined by careful experiments so as to nearly average the resistance to the uneven loads at inside and outside of rail under various conditions.

"The plate is made of steel three-eighths of an inch thick and provided with three lugs or teeth of triangular

#### Locomotive Boiler Explosion at Ravenna, Ohio.

A bad boiler explosion occurred at Ravenna, Ohio, on July 23. The engine was on a side track waiting for a passenger train. Shortly before the explosion the fireman told the engineman that he had better shut off his blower, there being three gages of water in the boiler. The engineman went into the cab and almost immediately the boiler exploded. The boiler left the tracks and was carried directly forward about 70 ft., the front end burying itself 5 ft. in the ground and breaking a 90-lb. rail.

The flagman and fireman both agree that the injector



Locomotive Boiler Explosion—Ravenna, O.

had been on for about 15 minutes prior to the explosion. The force of the explosion turned the crown sheet inside out. Examination of this sheet disclosed a large burn in the center, but the railroad employees state that this was done in the shop by firing up without water in the boiler. A number of the staybolts showed signs of burning at

TABLE SHOWING NUMBER OF SHIPS IN COMMISSION TO FOUR PORTS, CLASSIFIED ACCORDING TO ENGINES AND HULLS.

	March 1852	March 1862	March 1872	March 1882	March 1892	March 1902		March 1852	March 1862	March 1872	March 1882	March 1892	March 1902	
	Sew.	P. W.	Sew.	P. W.	Sew.	P. W.		Sew.	P. W.	Sew.	P. W.	Sew.	P. W.	
Norfolk . . . . .	12	1	0	0	12	3	Norfolk . . . . .	0	0	0	4	1	0	Steel.
Charleston . . . . .	0	4	0	0	0	0	Charleston . . . . .	0	0	3	3	1	0	0
Savannah . . . . .	0	2	0	0	5	3	Savannah . . . . .	0	0	0	0	1	4	0
New Orleans . . . . .	0	3	0	0	12	1	New Orleans . . . . .	0	0	13	0	0	6	0
Total, four ports . . . . .	2	10	0	0	19	13	Total, four ports . . . . .	12	0	0	25	7	16	12
*One twin-screw included.														

their trade has progressed normally, without any especial fluctuations, and has at all times been conducted by "good" boats, according to the standards of the period. It is noteworthy that, except for the tenaciously surviving "Wyanoke" and "Old Dominion," there were no paddle boats after the seventies, and that there were only two propellers before, in commission to the ports in question. Wood and iron, as hull materials, changed places at just about the same time. Steel does not come in until the present decade, and twin screws are evidently to be reserved until the next.

#### The Compensation Tie Plate.

The Herden Compensation Tie Plate Company, of Galeton, Pa., is building a plant for the manufacture of their tie plate, which was designed by Mr. Herden, Chief Engineer of the Buffalo & Susquehanna R. R.

This plate is the result of many years' close observation of the action of the rail upon ties, and the designer

shape, which cannot break, as they are cut out of the flat steel and bent over at right angles to the plate. It assumes instant stability when placed on the tie, tripod fashion, and the lugs penetrate the fibers of the tie readily and in a diagonal direction, so as to cause resistance longitudinally and laterally. The result of the service of this plate on 20 deg. curvature and subjected to traffic of very heavy motive power is very evident and gratifying after it had received the usual pounding and ties became decayed.

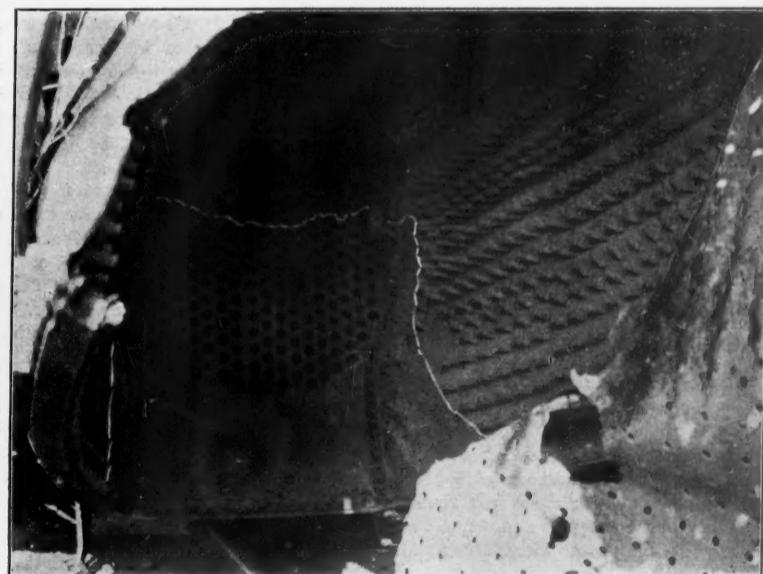
"It may be here of interest to state that the success of this plate depended entirely on the manner of making the lugs or teeth. After consulting and employing the most expert die and punch makers in the country, it was found impossible to produce a tool that would cut and bend the teeth without deformity, elongation or fracture at the wide part of the tooth near under side of plate, as the metal proved too thick for any operation suggested. The originator of the plate was then obliged

to also design a tool that would produce teeth in the plate as intended. This tool consists of a rolling die that cuts and bends the teeth and performs both operations properly at just the certain stages when other tools caused an undesirable article. The finished plate as now made has the appearance as if it had been cast with regard to the teeth and is mechanically perfect. Without this tool, the success of the plate would have been very problematical, in fact, it was not possible to make it as designed, which proves again what an important place tools of an improved pattern occupy in the industrial world."

The railroad which the French are building in their colony Tongking from Hanoi to the Chinese border crosses the Red River by a bridge more than a mile (5,603 ft.) long. It cost more than \$1,200,000 and required 6,380 tons of steel. It was necessary to erect canvas canopies to protect the workmen on the structure from the terrific heat of the sun, alternating with torrents of rain.

the head. The boiler also contained considerable scale.

The mate to this engine blew up three days later at Connellsville, Pa. The engines were eight-wheel switch-



Interior of Fire-box After Explosion.

ers. Our engravings show the position of the boiler after the explosion, as also the interior of the fire-box.

#### An Approximate Formula for the Speed of a Locomotive.

GEORGE F. SUMMERS, M. E.

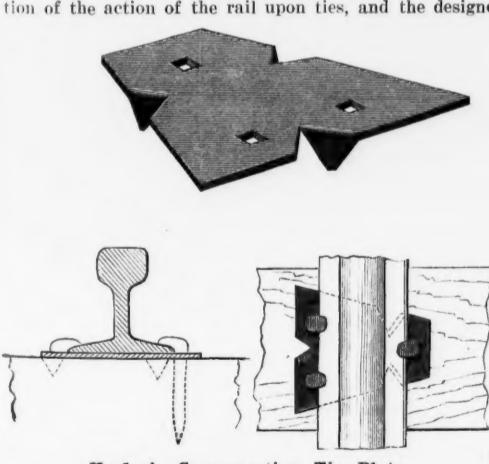
The following formula will give approximately the maximum speed at which a locomotive will be used.

$$25D = \frac{Miles per hour}{S}$$

where: D = diameter of drivers in inches.

S = stroke in inches.

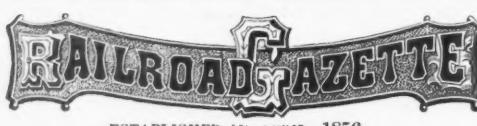
This formula is based on a piston speed of 1,400 ft. per minute. On page 569 of the *Railroad Gazette*, 1901, Prof. Goss intimates that 400 r.p.m. should be considered maximum. This would be equivalent to the above formula with a stroke of 21 in. For engines with 25 in. stroke, the maximum speed will equal the diameter of drivers in inches.



Herden's Compensation Tie Plate.

came to the conclusion, after thoroughly experimenting, that the rail can be prevented from cutting into ties first at the outer edge by providing means for a greater resistance to penetration of tie at this place and reducing this resistance at the inner side of the rail.

The inventor explains his theory thus: "Any flat piece of steel when placed under the rail will do some good work when ties are new or of hardwood, but the inevitable action of the rail soon begins its work at the outer edge of the base of the rail and keeps on cutting there, especially on sharp curves and under severe service, when



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#### EDITORIAL ANNOUNCEMENTS.

**CONTRIBUTIONS**—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

**ADVERTISEMENTS**—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The Chicago & Alton has an interesting and, what seems to us, excellent plan in what is called an employment bureau. This is at present under the charge of the Superintendent of Telegraph, and in connection with this bureau he will endeavor to make a record of young men eligible for employment with the company as telegraph students, operators, clerks, brakemen, firemen, etc. It is the design that he shall personally see these young men and make such record of their probable qualifications as will lead to proper selection and classification. One of the important objects aimed at is to recruit employees from among the people living along the line of the road, thus helping further to identify the interests of the communities with the interests of the railroad company. Such a policy cannot fail to have good results, and there is no apparent reason why an important percentage of the employees of a railroad company should not gradually be drawn from among the citizens living along its lines. Years ago this used to be the case, and a considerable part of the people took almost an hereditary and proprietary interest in their railroad. This led to recruiting a class of substantial and permanent citizens, who lived and voted where they worked. They were not only railroad men, but they were selectmen, town committeemen, school trustees and Sunday-school teachers, in their various towns. The restoration of such an ideal condition would be one of the best things that could happen to the railroads of the country.

#### A Question to Be Decided in Connection with Per Diem Agreements.

The operation of the per diem agreement will bear hard on those railroads which come under the control of State laws, granting to shippers and consignees a specific number of days for loading and unloading. In such cases the roads must consider whether or not they are under the necessity of submitting to such laws without complaint. This question it will doubtless now become profitable to consider, and, perhaps, to present to the courts in some proceeding designed to decide whether such State laws are constitutional.

In starting the discussion of this question we will take a case in the concrete.

The State of Connecticut some years ago passed a law that no railroad in that State should collect from any shipper or consignee any charge for delay or detention of cars in loading or unloading them, for any period of less than four consecutive days, Sundays and legal holidays excluded; such four days to be computed from the time the cars shall be accessible to shipper or consignee for loading or unloading.

The effect of this law has been to give to the shipper and consignee in every case four days' use of track and car without any reference whatever to the time actually necessary for loading or unloading, or the value of such use to the shipper or consignee, or

the loss thrown upon the railroad without recourse or compensation. And, moreover, according to the testimony of officers of the New York, New Haven & Hartford the same result has followed in other States, for the railroad companies did not deem it politic to make a sharp distinction at the State boundaries.

The general law on this subject is sensible and well ascertained. It is, in brief, that every carrier must give a reasonable time to the shipper to load and to consignee to unload. What is a reasonable time is to be determined by the circumstances of each case. Each party to the transaction is expected in the law to act sensibly, not to stand on trifles or require more than is right. The law leaves a fair margin for a difference of opinion on the subject, and requires the carrier as well as the shipper and consignee to concede to each other the benefit of any doubt. The carrier may lawfully establish general rules in the premises, but he must take care that they are reasonable, with a certain elasticity to cover special cases, so that they will operate generally without hardship on any one. The shipper or consignee has no right to be sluggish, or sharp, or even inconsiderate, in his dealings with the carrier, but must in all cases justify his conduct by the code of business and common sense. If either party break these principles, the other may claim damages.

To protect the weaker against the stronger party, it has long been regarded as a proper exercise of legislative power to lay criminal penalties upon carriers for proceeding oppressively in such matters, as well as to make reasonable rules as to the receipt and delivery of freight. But when legislatures seek, under the guise of this principle, to extort from the carriers unreasonable privileges in favor of shippers, they may be challenged, as going beyond their constitutional prerogatives.

Recurring to the Connecticut law, it is apparent that four days would be, under certain circumstances, perhaps in many cases, an unnecessarily long time to load or unload a car. It may well be that to require the carrier to give his track and his car for four days to a shipper to load, or a consignee to unload, would require him to furnish the use of his property to another four times as long as the real purpose of the use requires. This excess of necessary use passes without any compensation to the carrier, and is in its nature a largess or gift to the shipper or consignee at the carrier's expense. It amounts, therefore, in the case supposed, to taking away the property of the carrier and giving it to another. To this extent it is confiscation, and nothing else. And if so, it is plainly forbidden by the Constitution of the United States.

Instances of this sort of legislation have been more or less common. Indeed, there is perhaps nothing that appeals more to the practical politician than legislative forays of this kind. And yet they are not successful, when contested. This Connecticut law has, so far as we are informed, never been challenged, because, we dare say, it has not been sufficiently burdensome on the railroads affected. Now, however, that the per diem agreement has gone into operation, the Connecticut roads may have to take an account of these free gifts to the shipper and consignee, and determine whether they can afford them any longer.

Confiscatory legislation of this sort is not confined to any particular locality. The reader will recall two salient instances, the Minnesota case in the far north and the Texas case in the far south.

In 1887 Minnesota passed a law establishing a railroad and warehouse commission for the purpose of fixing rates for the transportation of property. This law provided that the rates so fixed should be final and conclusive. The commission, acting under the law, fixed certain rates, which the Chicago, Milwaukee & St. Paul found far too low, and refused to accept. The railroad brought to the Supreme Court of the United States the proceedings against it to enforce such rates, alleging that the State had no power to pass a law requiring the transportation of property at unreasonable rates. The court upheld this contention, and pronounced the law to be in conflict with the constitution, as depriving the company of its property without due process of law.

In 1891 the State of Texas established a railroad commission with power to fix rates. Acting under the law, the commission established certain rates for the railroads in the State. The International & Great Northern alleged that these rates were unjust and sought an injunction against the commission in the Circuit Court of the United States, restraining enforcement of the tariff. The rates were found by the court to be unreasonably low, and the commission was enjoined from enforcing them. It was held that while a State has a right to fix rates, either di-

rectly or through a commission, it was always within the power of the court to inquire into the reasonableness of such rates and to prohibit them if found unjust, as taking private property without compensation. And in so far as a law attempted to forbid such inquiry, it was held to be void. This was the *Reagan* case, decided in 1893, when the Supreme Court used this weighty language:

"The equal protection of the laws which, by the Fourteenth Amendment, no State can deny to the individual, forbids legislation, in whatever form it may be enacted, by which the property of one individual is without compensation wrested from him for the benefit of another, or of the public. This, as has been often observed, is a government of law and not a government of men, and it must never be forgotten that under such a government, with its constitutional limitations and guarantees, the form of law and the machinery of government, with all their reach and power, must in their actual workings stop on the hither side of the unnecessary and uncompensated taking or destruction of any private property legally acquired and legally held."

It seems to us, therefore, that the way is open to the railroads concerned to question in the courts the reasonableness of such a law as that in Connecticut, in requiring the carrier to allow a certain number of days in every case, whether necessary or not, for loading or unloading freight. If the carriers can show that the provision is generally unreasonable in fact, it would seem to follow that such laws are unconstitutional and void. The conditions may fairly be said to be precisely the same, as far as the fundamental principle is concerned, as in cases of transportation rates, like those decided in Minnesota and Texas. That the railroads can show that four days is an excessive period, no person acquainted with the facts will question for a moment. Even admitting that four days is required at some times or for certain commodities, or in exceptional locations, the fact remains that in the great majority of cases, probably 75 to 95 per cent., two days is sufficient. A large percentage of bulk cars are loaded in a few hours and are unloaded within one day. This is not only a matter of universal experience, it is a matter of record. The demurrage bureaus at the various large cities show that the average detention of bulk cars is a day and a half, a day and three-tenths, and such-like figures. At such places as Cleveland, where consignees have been allowed to save themselves demurrage bills on long-detained cars, by putting forth special efforts to quickly unload other cars (when circumstances are favorable), they have shown even better average time than this. The absurdity of the law is apparent when it is considered that the 96-hours' free time is allowed on hopper-coal-cars, which can be unloaded in one minute. With such cars the consignee is simply encouraged to be dilatory.

It is to be hoped that the principal railroad in Connecticut will test this law, if only for the sake of the principle and to get the true theory laid down by the courts for the instruction and reproof of other States. As a practical matter, the way to show consignees that it is right and necessary to unload cars promptly is to convince them, as the best demurrage managers have convinced them, in certain cities, that it is for the best interest—both immediate and remote—of the consignees themselves. But whether this can be done without first getting the law out of the way, we are not prepared to say. To not begin business-like treatment of a car until after it has stood four days under the go-as-you-please rule, is like pulling a train over the road with a switch rope—you are working at arms' length.

#### The Eastern Illinois Purchase.

A quite unexpected announcement has been made forecasting an important realignment of traffic interests, viz., that the St. Louis & San Francisco Railroad Company has purchased the Chicago & Eastern Illinois Railroad. While it has been known in a general way that negotiations had been undertaken looking to a sale of the controlling interest of the Chicago & Eastern Illinois long held by Mr. H. H. Porter and his associates, there had been no intimations that the St. Louis & San Francisco desired to secure control of this property or an entrance to Chicago.

Arrangements with other roads will have to be depended upon to furnish a connection between the two roads until a new line can be built. Plans for building such a line are understood to be already under way and the suggestion is that connection will be secured by a new line from St. Louis to Shelbyville, Illinois—a point on the main line of the Chicago & Eastern Illinois about midway between Chicago and its terminus on the Mississippi River at Thebes, Ill., some miles north of Cairo. Until this new line is completed, the St. Louis & San Francisco can reach the Chicago & Eastern Illinois at Shelbyville over the tracks of the Toledo, St. Louis &

Kansas City or the Big Four from St. Louis, and it also can secure a connection with the line at Thebes by a rather roundabout route, using a branch, and the road of a local company with which it has some affiliations.

Control of the Chicago & Eastern Illinois is sold on a basis of receiving from the new owners 10 per cent. in dividends on the present outstanding \$7,197,800 common stock, and 6 per cent. on the present outstanding \$6,830,700 preferred stock. Six per cent. dividends have been regularly paid on the preferred stock since 1888, except in 1891, when 4½ per cent. was paid. The dividend on the common shares has been on the basis of 6 per cent. in the past fiscal year, that rate having been established in 1901, when 5½ per cent. was paid out of the year's earnings. Dividends on the common stock were begun only in 1898 with a payment of 2½ per cent., a rate increased 1 per cent. each year until the 6 per cent. rate was established in the 1901 fiscal year.

In carrying out the arrangement for purchasing and taking over control and operation of the property, the St. Louis & San Francisco proposes a variation of the usual plan of issuing collateral trust bonds secured by deposit of the stocks of the purchased property, followed in financing the many recent operations for taking up outstanding shares, as is the new Rock Island capitalization plan, in the Reading's purchase of a majority of the shares of the Central Railroad of New Jersey, in the Erie's purchase of the Pennsylvania Coal Company, etc. The present holders of the two classes of stock of the Chicago & Eastern Illinois Railroad are offered in exchange for their securities new stock certificates of the St. Louis & San Francisco Railroad on the basis of \$150 par value in new preferred trust certificates for \$100 par value of the existing preferred stock, and \$250 in new trust certificates for \$100 par value of the present common stock. The arrangement, it will be seen, provides for payment of 6 per cent. on the present preferred stock, and of 10 per cent. on the common stock, which will be deposited in the custody of the St. Louis & San Francisco Railroad for the trust certificates, issued by that company and paying 4 per cent. dividends, which will be negotiable securities. The official announcement is brief and enters into no other particulars of the position of the old stock or the new trust certificates or of the liability of the St. Louis & San Francisco in case the Chicago & Eastern Illinois does not earn the dividend charges assumed. Nor does it state whether in case of default the holders of the trust certificates have any right of foreclosure or any other remedy.

As a financial operation then the proposal is to issue a total of \$28,240,600 new trust certificates in place of \$14,028,500 stock now outstanding. Of the new securities about \$17,995,000 will be issued for the old common stock, and \$10,246,000 for the old preferred shares. The dividend at 4 per cent. on the total of the new securities will be \$1,130,000 as against \$841,000 accruing under the present 6 per cent. rates on the existing shares. This dividend payment, however, has been made only in the last fiscal year; the dividend paid by the Chicago & Eastern Illinois Railroad in the 1901 fiscal year on stock then outstanding amounted to \$750,721, which left a balance of \$317,245 on the year's revenue operations. In the 12 months to June 30, 1902, there were material increases in gross and net revenues, and preliminary figures available for the 12 months show a balance over all fixed charges of \$3,060,397 as against \$2,652,749 in 1901. This is an increase of \$427,648, the enhancement in gross earnings having been \$618,047. The net income for 1902 left a surplus over charges and taxes of \$1,448,881, or a balance of \$1,039,000 available for the common stock after the deduction of 6 per cent. preferred dividends. This was equal to nearly 14½ per cent. on the common stock, so that on the basis of the 1902 earnings there would be an apparent profit to the St. Louis & San Francisco over the dividend charges assumed under the terms of purchase, if no allowance is made for appropriations for improvements and betterments. In 1901 the Chicago & Eastern Illinois appropriated all its surplus over dividends paid for improvements, etc.

The utility of the Chicago & Eastern Illinois Railroad to the St. Louis & San Francisco seems to lie mostly or altogether in giving that company entrance into Chicago from St. Louis. The St. Louis & San Francisco Railroad does not appear as a member of the Terminal Association of St. Louis, which controls the bridges across the Mississippi River at St. Louis; and no announcement has yet been made as to how the St. Louis & San Francisco proposes to get its trains across the Mississippi River to East St. Louis.

The St. Louis & San Francisco would use only 214 miles of the present main line of the Chicago & Eastern Illinois, with the connection for business between St. Louis and Chicago made at Shelbyville, Illinois. In purchasing the Eastern Illinois property, then, the St. Louis & San Francisco does not secure a share in existing business controlled by that property between Chicago and St. Louis, but must develop or divert a traffic over this route. The Chicago & Eastern Illinois Railroad, however, is at present a link in a traffic route from Chicago to Texas and the Southwest, operating over 400 miles of its line from Chicago south to the Mississippi River at Thebes and thence via the St. Louis South Western Railway, one of the Gould lines, a route opened in 1900. A car ferry between Thebes, Illinois, and Gray's Point, Missouri, is to be replaced by a bridge across the Mississippi River being built by the Southern Illinois & Missouri Bridge Company in the interests of the connecting lines. Since the extension of the Eastern Illinois to the Mississ-

ippi River at Thebes, the Illinois Central, which was the Chicago connection for the St. Louis South Western before it removed its Mississippi River terminus to Gray's Point, has also built a short branch into Thebes and operates a parallel and competing line between Chicago and the Mississippi River at Thebes. If the St. Louis & San Francisco builds from St. Louis to Shelbyville it will operate a route between these points directly competitive with the Chicago & Alton and the Wabash roads and other lines.

To feed this new connection into Chicago, the St. Louis & San Francisco now operates about 3,370 miles of road with extensions building in the southwest, particularly in Texas and Oklahoma, which will add to this total. Not all of this road, however, will be directly tributary to the Chicago & Eastern Illinois, because it includes the former Kansas City, Ft. Scott & Memphis system extending from Kansas City through Missouri to Memphis, Tennessee, and thence to Birmingham, Alabama. The acquisition of the Eastern Illinois by the St. Louis & San Francisco is, as a matter of fact, only the latest development of the very ambitious plans of the management, which since 1897 has increased the company's controlled and operated mileage nearly four times.

The company was organized in 1897 as successor to the St. Louis & San Francisco Railway, which previously had been operated by the Atchison Company. The reorganization committee of that company did not see its way clear to enlarge the scope of the Atchison reorganization plan and to secure additional capital which would have been required to retain the St. Louis & San Francisco as an Atchison line. Reorganized independently, the new St. Louis & San Francisco Railway operated on June 30, 1897, at the end of the first fiscal year of the new company, 1,162 miles of road comprising a system from St. Louis to Paris, Texas, with a division extending from Monett, in southwestern Missouri into eastern Kansas, to Wichita, with a few other short branches. On June 30, 1901, the St. Louis & San Francisco Railroad operated 1,915 miles of line. This addition of 753 miles to operated line consisted of small roads taken over and also of extensions built, particularly in the Indian Territory, Oklahoma and Texas. These additional lines included 112 miles from near Monett to Sapulpa, Indian Territory, formerly the central division of the Atlantic & Pacific, and extension of this line 103 miles to Oklahoma City; 262 miles of newly constructed mileage from Sapulpa south toward Fort Worth, Texas, 55 miles additional of trackage bringing the route to Fort Worth, where connection is made with the Ft. Worth & Rio Grande Railway, purchased during the past year and operating 146 miles to Brownwood, Texas. From that point it has been proposed to build south to San Antonio, Texas, to secure a direct connection with the Mexican Central, by the latter company or a corporation in its interest building north. The Mexican Central Railroad is now controlled by H. Clay Pierce, of St. Louis, who is the chairman of the St. Louis & San Francisco Railroad and its principal owner. Other new lines secured by the St. Louis & San Francisco include a division into Kansas City from the south, as well as an extension of 100 miles of the branch in Eastern Kansas. Finally, in 1901, the company secured control of the extensive Kansas City, Ft. Scott & Memphis system with its route through Memphis to Birmingham, Alabama.

It will be seen, then, that within five years, the St. Louis & San Francisco Railroad has been developed from a property operating less than 1,200 miles from St. Louis into Northern Texas and with little more than local importance, into an extensive system of over 3,700 miles extending over a wide stretch of territory. Operating as a southwestern system, it has been interested in the movement of traffic from the grain fields of Eastern Kansas and from the Missouri River at the Kansas City and St. Louis gateways, into Texas. With the acquisition of the Kansas City, Ft. Scott & Memphis system it secured a long line across the Mississippi River to the Northern Alabama coal fields, and now it has secured an entrance to Chicago with good facilities there, the Chicago & Eastern Illinois being part owner of the Chicago & Western Indiana, and also owning quite valuable terminal property of its own in or about that city. Though it assumes a liability of \$1,130,000 in the purchase of the stock of that company, besides prior interest charges, which in 1901 amounted to \$1,340,000, its management states that the value of controlling its own line into Chicago from St. Louis is easily worth the liability assumed on that account.

The cotton manufacturers of New England, and others interested in the cotton traffic, are now loudly complaining against the New York, New Haven & Hartford and the Boston & Maine for withdrawing the through freight tariffs from the south and west. Local rates being charged, cotton cannot now be sent into New England by rail except at rates much higher than those which have prevailed heretofore. The cotton men profess to believe that the New England roads are glad to have cotton reach New England ports by steamer, and to make their profit out of the short railroad haul from the ports to the mills. What the cotton men are going to do about it we do not know, but we believe they think of laying their grievance before the Interstate Commerce Commission. We do not suppose that the New Haven and B. & M. roads desire any certificate of "character" from us; but if the cotton men really have any doubts of the sincerity of the railroad men we would urge them to get and read the proceedings of the American Railway Association at its April meeting. Those proceedings have

just been printed, as will be seen from a notice in another column, and the reader of the report of the discussion on the per diem car service question will very quickly disabuse himself of any idea that the New Haven road is not standing up vigorously for its cotton mills. Indeed, it seems a pity that conditions have got so bad that such a poor cause can enlist such valiant defenders. For the fact is, of course, that the cotton men have heretofore got thousands of dollars' worth of free storage and that the western railroads have had to bear a big share of the resulting loss. Just how the loss ought to be divided, as between the Eastern and the Western roads, is a question which, of course, we do not pretend to take up, but it is important to keep in mind that it is a loss. The only rational remedy is to get the cotton out of the cars. In connection with the question of per diem it is gratifying to note that two roads have announced that they will discontinue the mileage system on private cars as well as on cars belonging to railroad companies. These roads are in far-off Mexico, the Rio Grande, Sierra Madre & Pacific and the Mexican Northern, and their business is not large; but they have, nevertheless, set a good example which larger roads would do well to follow. These Mexican roads promise to furnish mileage reports as before, and they announce that they will expect similar information from other roads.

Despatches from the northwest say that there is "almost a certainty of another freight blockade at the head of the Lakes when the grain crop begins to move." It will be a matter of great interest to see how the railroads get along in handling the heavy crops that are now almost certain. It goes without saying that within the last two or three years they have increased their equipment enormously, both in power and in cars, but it is not practicable to provide a surplus of power and cars sufficient for periods of great movement. Furthermore, equipment is already pretty well occupied with moving other things than grain. It would not be at all surprising if what people call a "car famine" should manifest itself.

#### NEW PUBLICATIONS.

*Magazine of Arboriculture.*—Mr. John P. Brown, Secretary-Treasurer of the International Society of Arboriculture, announces that the publication of a magazine devoted to the science of arboriculture will be begun on Sept. 1. It will be 7 x 10 in., will contain from 16 to 24 pages, and will be fully illustrated. This magazine should be of especial interest to railroad companies and officials, as it will be devoted largely to the economic planting of timber and the management and care of forests. Mr. Brown will be the editor and the office of publication will be at Connersville, Ind. The prospectus announces that each paid subscriber will receive gratis 100 trees of catalpa speciosa, or other forest trees, thus making this a practical tree planting society.

#### American and English Railroad Rates.\*

It would seem that Mr. Gibb's examination of American rates has not had so extended a scope as to warrant the broad assertion that "for the quantities in which English traders actually consign their traffic, and for usual English distances, English rates are lower than American."

It is quite true that the figures he gives as American rates do exist in American rate tables, but they only apply to sparsely settled districts of limited area, where the business offering is a mere drop in the bucket.

In much the larger portion of the territory extending longitudinally from the Atlantic coast to the Ohio River, thence to the Mississippi River, and latitudinally from the Great Lakes to the southwestern bend of the Ohio River, American rates for less than carload lots do not make anything like so unfavorable a comparison with English rates as those given by Mr. Gibb. The following table is a reproduction of his figures, to which are added the rates that apply to fully 90 per cent. of the business carried in small lots in the above-referred-to territory for distances of 40 up to 50 miles:

Commodity.	American rates as per Mr. Gibb.		American rates as per Mr. Gibb.		English rate.
	s. d.	s. d.	s. d.	s. d.	
Bricks (common) . . . . .	12	2	• •	• •	4 6
Bricks (loose or in bundles) . . . . .	• •	• •	10	10	8 4
Bricks (in barrels or boxes) . . . . .	• •	• •	6	8	6 3
Cement . . . . .	8	5	7	6	5 10
Flour, in sacks . . . . .	7	6	6	8	6 8
Malt, in bags . . . . .	7	6	6	8	7 1
Oil cake . . . . .	7	6	6	8	6 8
Potatoes, in bags . . . . .	8	5	7	6	6 8
Plates and bars . . . . .	8	5	7	6	6 5 0
Stone (rough building) . . . . .	8	5	6	8	4 2
Ale . . . . .	12	2	10	10	10

It will be seen from this table that west of the Ohio River, in a territory largely exceeding the whole area of the British Isles, American rates are lower in four cases, equal in one, and higher in four. It must also be borne in mind that American rates are quoted per 100 lbs., so that the smallest consignment is charged no more proportionately than one of five tons. Mr. Gibb leaves us in doubt on this point. Is he prepared to state that his rates apply on lots of less than five tons?

Now, whether Mr. Gibb when writing his letter had in his mind's eye internal or export traffic there

\*Letters to the *London Times*. For Mr. Gibb's first letter see the *Railroad Gazette*, July 11, p. 557.

is no doubt whatever that the share that American rates for small lots have in making up the price to the foreign customer of America's out-turn is infinitesimal. America's export traffic as a whole is carried at carload rates, which in practice are from 30 to 75 per cent. less than the rates in Mr. Gibb's table.

Would it not have been better, therefore, if Mr. Gibb had made a comparison between actual conditions? In that way he would have shown English traders what they were losing by not accepting his offers of rates for large quantities. As it is, he seems from any point of view to have done little more than introduce us to a theory. If he is in earnest in desiring to extend the use of large quantity rates, he should be able, considering the smaller carrying capacity of English cars, to start his minimum figure for the lower rates at considerably below the usual minimum in America.

MICHAEL B. WILD,  
Baltimore & Ohio Railroad Company.

I welcome Mr. Wild's assistance. The object of my letter was to establish a fact not generally known. My conclusion is now substantially confirmed by Mr. Wild, though he assumes the guise of a critic.

In the district mentioned by Mr. Wild, in which severe competition has had a disturbing effect, rates exist lower, in some instances, than the American rates quoted by me, but still higher than most of the English rates. The area of America is so vast and the conditions so diverse that one could not expect rates to be identical throughout.

On equal quantities of the nine staple articles dealt with, Mr. Wild's figures show in the aggregate an excess in American rates over English rates of 10 and 25 per cent, respectively west and east of Ohio River. In other districts, more nearly comparable with England, and with as dense a population as the English district specially compared, the excess on my table worked out at 42 per cent. The truth of the main proposition is, therefore, apparent.

But let me say that I am not attacking American rates. On the contrary, I admire and envy them. They are not a penny too high, considering the high cost of handling small consignments.

The American minimum for carload rates is 15 tons, and for less than carload rates 100 lbs., whilst the English minimum varies from 336 lbs. to four tons. For such commodities as those mentioned the low minimum is valueless, as no trader would think of consigning 100 lbs. of bricks, cement, etc.

I will not venture to accept Mr. Wild's invitation to discuss in detail the question of generally introducing carload rates into English railroad practice. As I indicated in my letter, most of our traders seem to prefer sending goods traffic in dribbles. A proposal to revise on the plan of increasing small quantity rates and reducing large quantity rates would probably arouse considerable opposition. It is no doubt difficult for Mr. Wild to appreciate this, as in America rates have to a great extent been fixed on commercial and business-like principles, railroads not being hampered by statutory maximum powers, framed on ideas half a century old, and by numerous legal restrictions, the unwise and injurious effect of which, I am glad to think, many are beginning to realize.

GEORGE S. GIBB.

#### Some New Points in Sleeping Car Design.

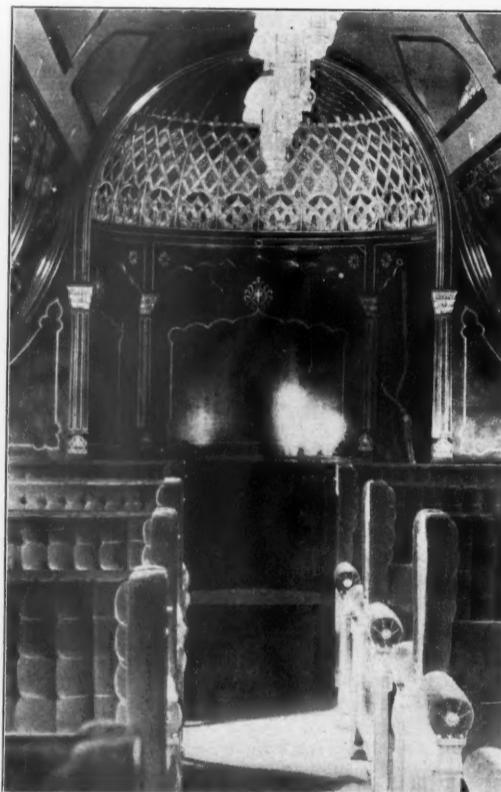
The Minneapolis, St. Paul & Sault Ste. Marie has recently put in service four sleeping cars built by the Barney & Smith Car Company, having some new features in their interior design. The general arrangement and dimensions of these cars are shown in the plan view, their length over sills being 72 ft. and over all approximately 79 ft.; they are 9 ft. 10 1/2 in. wide over side sills. The framing of the cars is after a new standard recently adopted by the builders to give greater strength and rigidity, required by the increasing weight and speed of passenger trains. The ends have wide vestibules, Standard

be a convenience to passengers who are waiting to be assigned to a section in the car. The vestibules are each surmounted by an art-glass dome, which greatly enhances their effect. The architectural design of the car is a study of Eastern India style, and the details have been carefully worked out from the carpets to the ceiling decorations.

#### The West Street Freight Railroad.

In the Mayor's "talk" of July 31 he treats of one topic which is of special interest to the freighting community, and on this I believe the transportation interests are a unit on the negative side. I refer to the river front railroad, which by means of spurs leading from the same can be connected with the North River pier system.

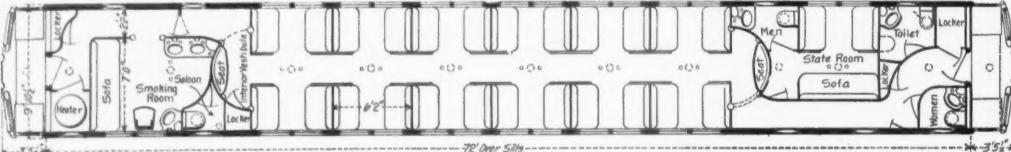
As one who has been closely identified for many years with railroad terminals, New York piers, and movements of freight of all descriptions in the harbor, by means of car floats, lighters, etc., and possessing a practical knowledge of the advantages and disadvantages of any system of operations to and from the New York shores, I desire to go on record to the effect that the conveying of freight



Sleeping Car for the Minneapolis, St. Paul & Sault Ste. Marie.

cars to New York City and thence over the rails of the river front railroad and spurs to piers will prove a dismal failure.

All railroads have their terminals on the adjacent shores, the only exception being the New York Central & Hudson River Railroad. Many acres of land are devoted to the massing and concentrating of in and outbound traffic. Many miles of tracks, an immense system of docks, floats, car-float bridges, lighters of many varieties, and other equipment, are maintained to distribute or forward the property coming to or departing from the New York shores; and the waters surrounding our city are made the medium of reaching the pier system and the bridges of connecting roads for interchange traffic. Noth-



Plan of Sleeping Car for the Minneapolis, St. Paul & Sault Ste. Marie.

steel platforms, and the Barney & Smith Company's anti-telescoping device. The bodies are carried on six-wheel trucks, having 40-in. steel-tired wheels.

The notable feature about these cars is a change in the interior design, the plan arrangement of the main room being along new lines. This change is immediately apparent from the engravings, the end arrangement of the room being different from the usual straight bulkhead. This new feature is called an "interior vestibule" by the builders, and while greatly improving the appearance of the main room, its utility was also considered in its introduction. The concave sides of the vestibules, which are semi-circular in plan, face the main room, and in each is built a seat large enough to accommodate two persons. These seats are for the use of passengers while having their berths made up, relieving them of the necessity of occupying a neighbor's seat. The seats will also

ing can be substituted which will accomplish the same results as to rapidity of movement, efficiency or economy.

The spur system from a river front railroad demands one or more large terminal yards on the New York shores adjacent to the river front, where the immense tonnage to and from our city can be massed; a base of operations, so to speak, where the sifting, sorting and assembling of cars can proceed, this for the purpose of establishing the precision and methodical results which must be attained.

The bulk of cars, if intended for placing on piers, would necessitate, first, assembling by pier lots, and then a subdivision as to car order on the pier, figuring in the matter.

Should the property be outbound it would have to be dragged to the New York massing terminal. Freight of various roads would have to be sorted, and then the process of consolidation for proper schedule would be necessary.

It is not my purpose to quote length of docks and show how many cars the side of a wharf will accommodate, so that three or four hatches of a vessel can be worked at one time, nor to discuss the clearance which is necessary in order that the cars can be pushed to the doorways of the pier next which the hatches are located.

More cars of freight can be made available on the New York pier system in one day under present methods, than could be cared for in a fortnight by the river front railroad spur idea, and the movements are accomplished without encumbering the streets of New York with freight cars.

Fortunately, one of the Rapid Transit Commissioners is the Hon. John H. Starin, a gentleman who for over 40 years has operated in the harbor of New York in the transportation business, and who is thoroughly posted on the needs of the piers.—*F. W. R. in the Sun.*

#### Steam Wagon Haulage in England.

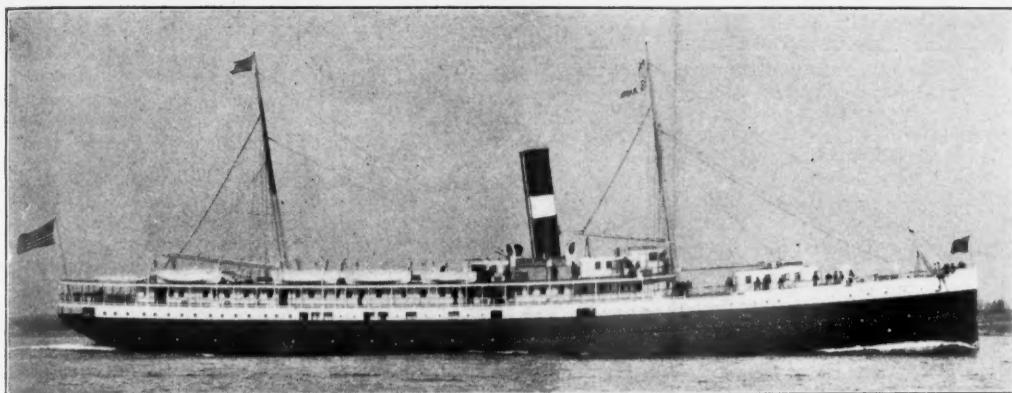
For the past four years considerable attention has been devoted in England to the question of the utility of motor vehicles for the conveyance of heavy traffic on common roads. This movement originated, and has been chiefly fostered, in Lancashire, where there are a large number of important commercial centers situated only a few miles apart, making railroad haulage uneconomical on account of the double transshipment from road van to railroad car. Moreover, the docks at Liverpool, the great port of this district, are not as a general rule served by railroad lines running along the quays, but it is the usual practice—dating from before the railroad era—to load the goods first of all into a road wagon consisting of a platform on wheels and known locally as a "lorry." This same remark, of course, applies to the handling of export freight at the docks. These circumstances make the distribution of local freight of Lancashire expensive to the railroad companies who undertake the terminal work at both ends and get a very short intermediate haul on the rails. The railroad rates are accordingly high.

Some years ago the laying down of what was called a "plate-way" to facilitate wagon haulage was influentially supported, but, since the passing of the Locomotives on Highways Act of 1896 removed the heavy restrictions hitherto imposed in England upon motor traction on common roads, automobilism has been favored in this and, to a lesser extent, in other districts as a means of relief from burdensome railroad rates.

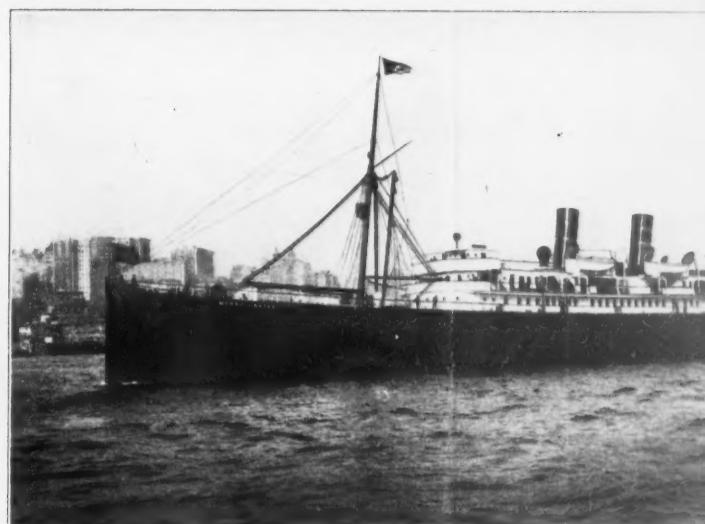
Practically all the pioneer work in connection with this interesting English movement has been done under the auspices of the Liverpool Self-Propelled Traffic Association. The Association has held trials of motor vehicles for heavy traffic. At the first, in 1898, the wheels of the vehicles proved structurally defective when subjected to the hammering action of the granite sets or cobble stones with which the streets of Lancashire towns are usually paved, whilst minor troubles arose with respect to adhesion and with the condensers, etc., of the motors, all of which were propelled by steam. The second trials, in 1899, provided satisfactory evidence that the tire and adhesion difficulties had been overcome, but the judges found that the strength of these vehicles was "below what is compatible with a satisfactory life in commercial work."

The third trials took place in the same neighborhood a year ago. This time the hopes of the Association were realized, for the judges reported last October that four of the types of wagons which competed in the preceding June might be relied upon for regular employment. For light loads (not exceeding two tons) a type of vehicle propelled by a petrol-fed internal combustion engine was recommended, but owing to the high cost of petroleum spirit in England the wide use of this class of wagon is not considered assured until they can use ordinary mineral oil without creating a nuisance. For general commercial requirements the steam wagon, using gas coke for fuel, holds the field. These vehicles, it is true, cannot be relied upon even in good weather to cover more than five miles an hour, as compared to an eight-miles-an-hour speed for the petrol class, but they can take more than double the load of the others, i. e., four to five tons on their own platform, which can be increased to seven tons if a trailer is attached. It is not difficult, indeed, to build a steam-propelled vehicle to carry 10 tons on its own platform, except for the necessity of complying with the limit of three tons tare prescribed for the United Kingdom by the Locomotives on Highways Act of 1896. This limitation has had a very hampering effect upon the progress of freight automobilism in England, and the Liverpool association has for some time been trying to get an amendment of the law in this respect. They urge that the object of protecting the roads would be met by the substitution of a limit of 16 tons total moving weight for the present limit upon the tare alone. The latter, it may be added, is as a matter of fact infringed by the great majority of the motor vehicles at present working in different parts of the United Kingdom, the tare of which is generally between three and four tons.

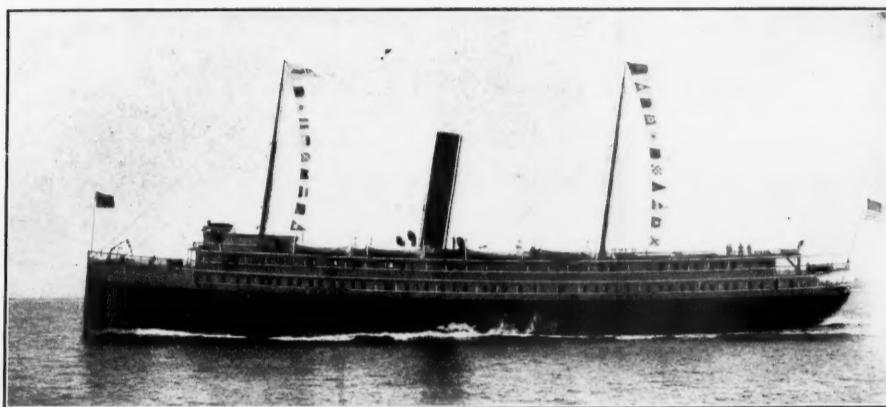
The motor wagons just referred to, which number about 100, represent, for the most part, the isolated experiments of individuals and firms who have substituted steam road traction for one or more of their horse teams. The results, from a financial point of view, have depended chiefly upon the kind of haulage required to be done (assuming, that is to say, that a trustworthy type of vehicle has been adopted). Steam wagon haulage on common roads would seem to be best adapted to a business which involves daily journeys of from 25 to 40 miles, such



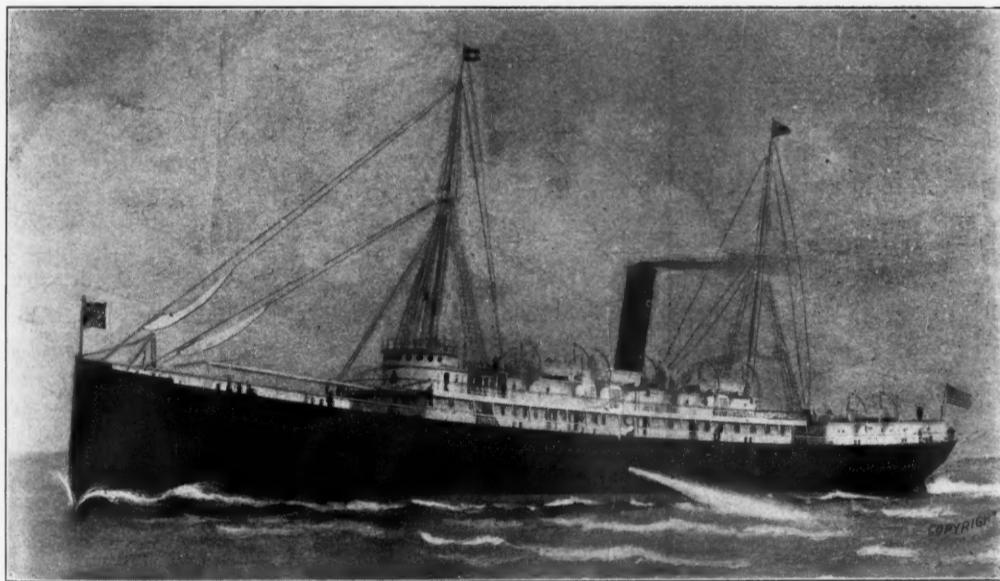
Princess Anne, 1897—3,079 Tons. Old Dominion Line.



Morro Castle, 1900—6,004 Tons. Ward Line. Off-Shore.



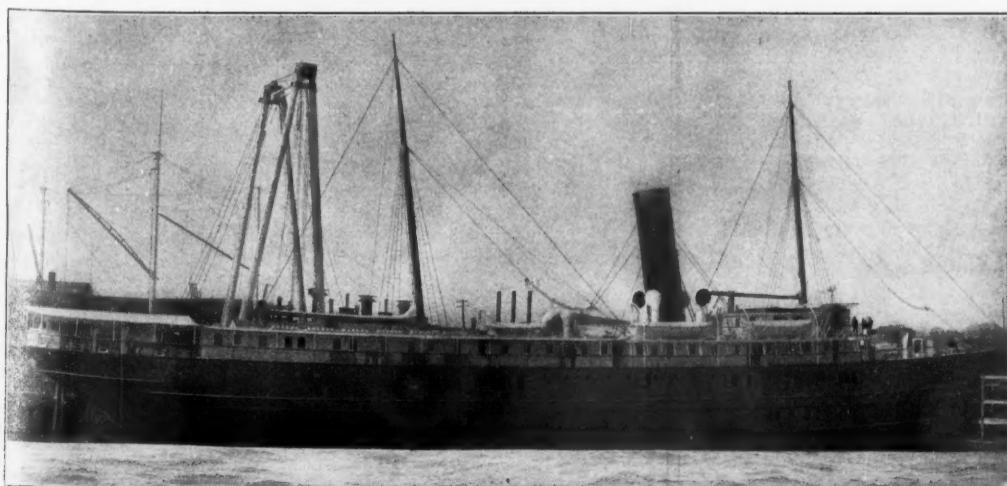
John Englis and Horatio Hall, 1898—3,168 Tons. Maine S. S. Co.



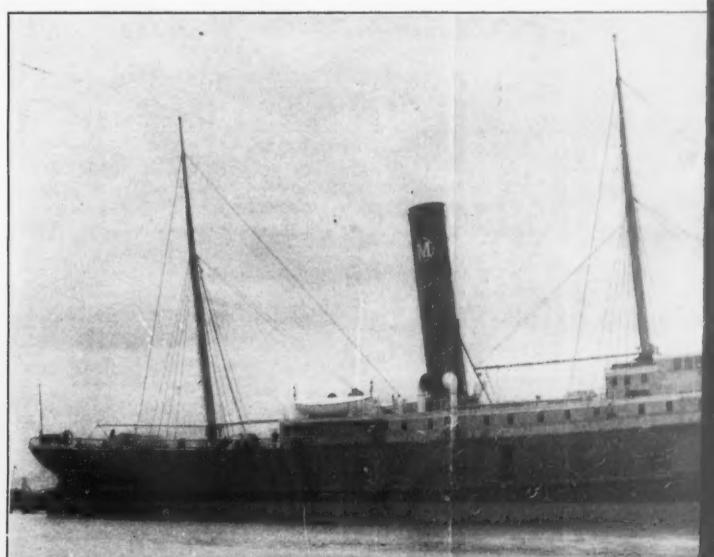
Comus, 1899—4,828 Tons. Cromwell (now Morgan) Line.



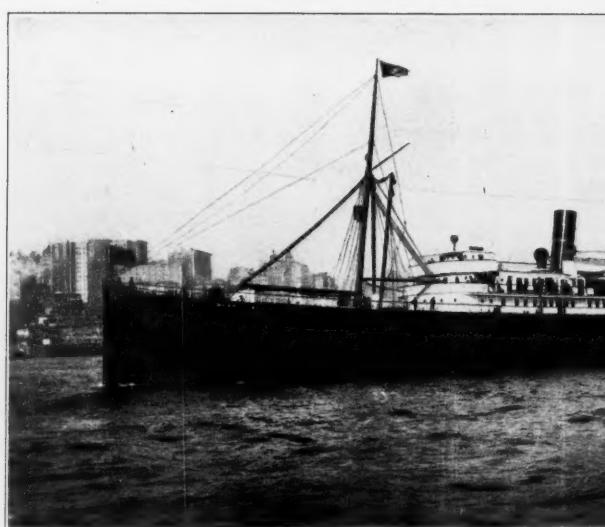
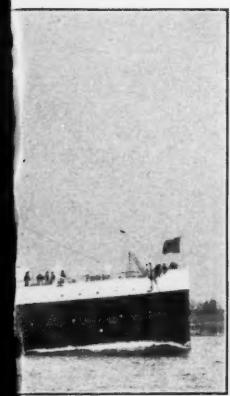
El Valle, 1901—4,605 Tons. Morgan Line.



Kershaw, 1899—2,600 Tons. Merchants & Miners Trans. Co.



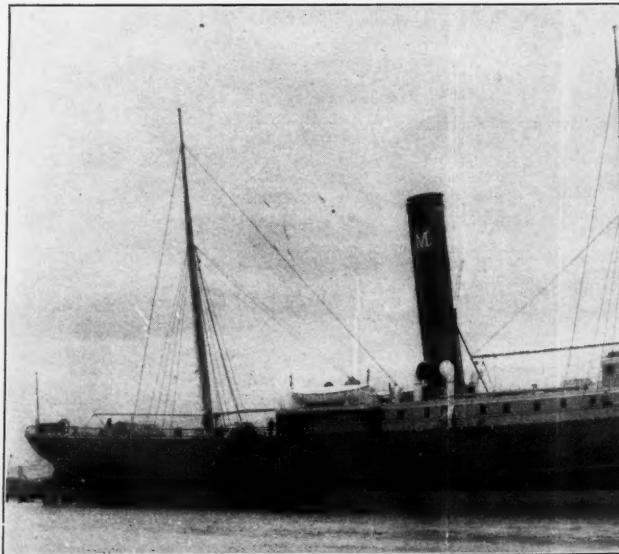
James S. Whitney, 1900—2,707 Tons. Metropolitan.



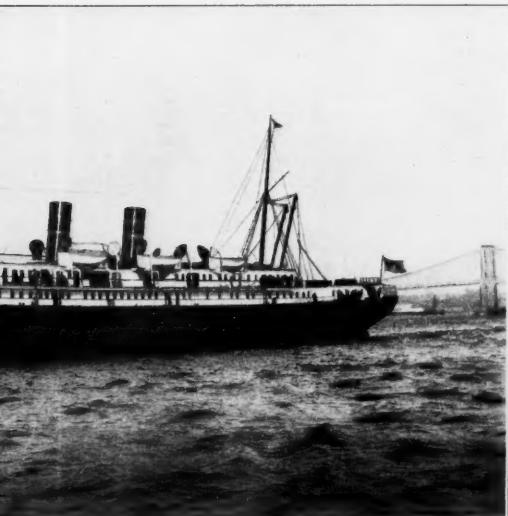
Morro Castle, 1900—6,004 Tons. Ward Line



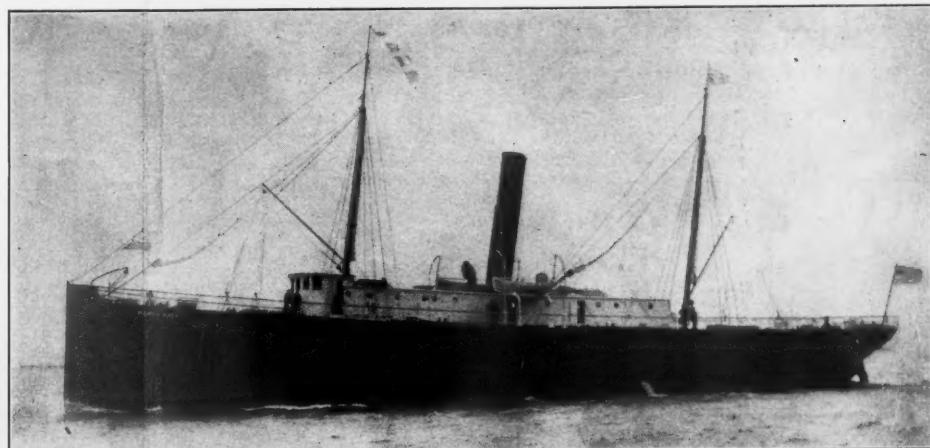
El Valle, 1901—4,605 Tons. Moro Line



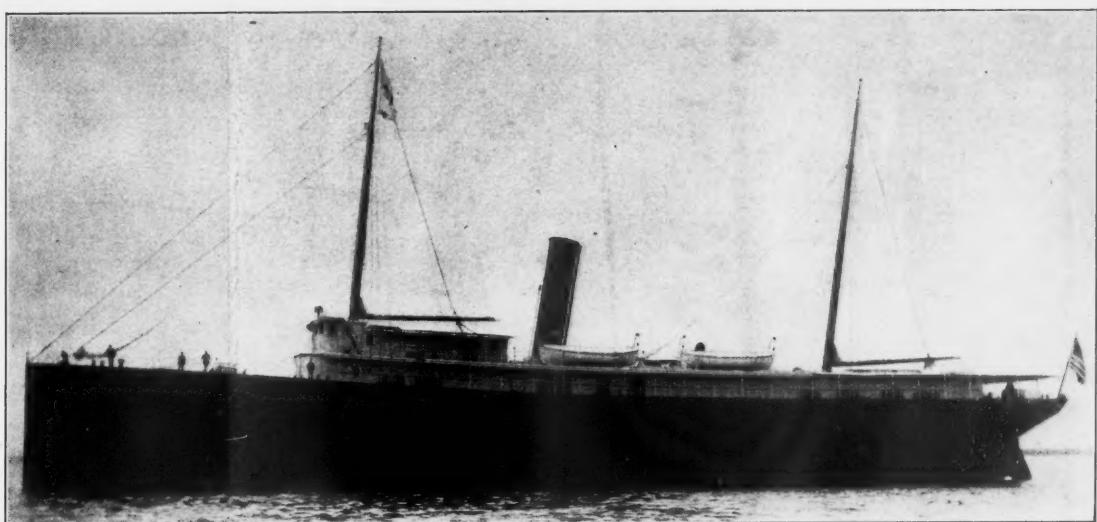
James S. Whitney, 1900—2,707 Tons. Moro Line



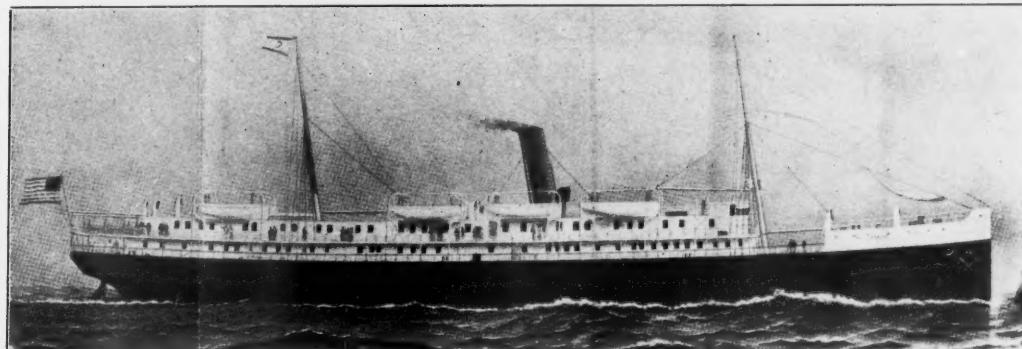
Ward Line. Off-Shore Service.



Manna-Hata, 1900—1,103 Tons. N. Y. & Baltimore Trans. Co.



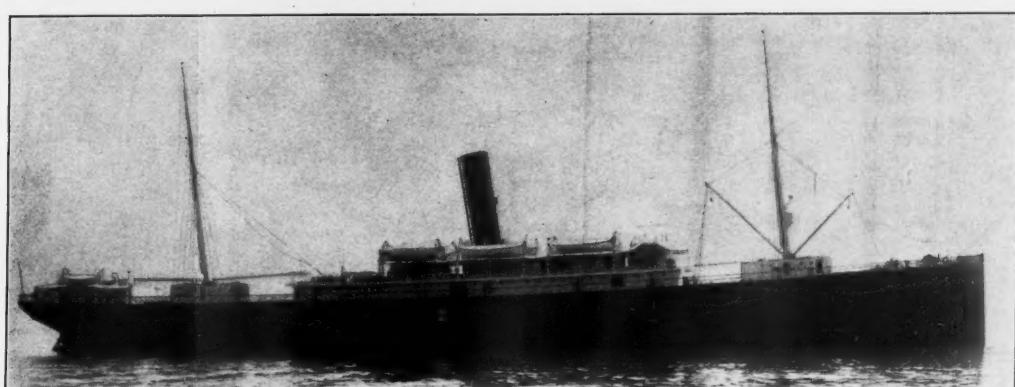
Grecian, 1900—2,827 Tons. Boston & Philadelphia S. S. Co.



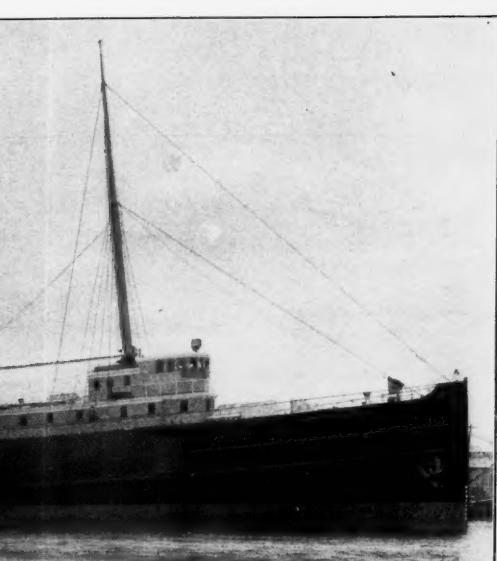
Apache, 1901—3,378 Tons. Clyde Line.



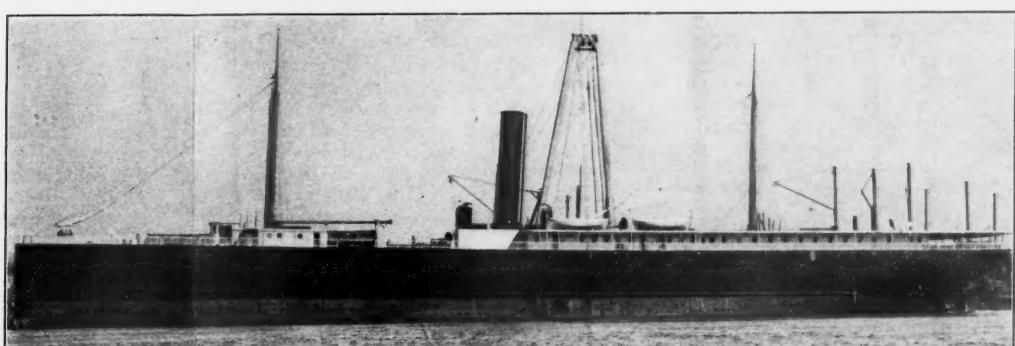
Tons. Morgan Line.



Denver, 1901—4,549 Tons. Mallory Line.



07 Tons. Metropolitan Line.



City of Memphis, 1902—5,252 Tons. Savannah Line.



as collection and delivery, which can be satisfactorily performed within 12 hours by a vehicle whose speed under favorable conditions cannot be trusted to exceed five miles an hour. Where the daily journeys are generally shorter than an average of 30 miles, horse haulage is usually found to be more economical, especially if the work involves any considerable amount of standing about waiting for loading and unloading. Similarly, for consignments requiring more than 40 or 50 miles to be covered in a day, the motor wagon cannot compete with the railroad.

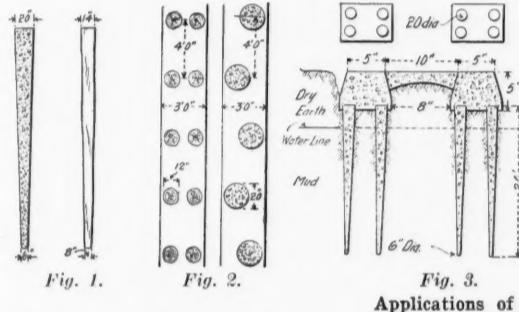
As an outcome of the Liverpool experiments a new undertaking is just beginning work in Lancashire under the title of Road Carrying Company, Ltd., of which Mr. Shrapnell Smith, the chief organizer of the three sets of trials above referred to, has been appointed general manager and secretary. Mr. Shrapnell Smith is an enthusiast for automobilism for freight traffic and as he has exhibited exceptional organizing powers, the enterprise promises well for success. It starts work with an equipment of 10 steam wagons, each of which can carry a load of four tons, besides hauling a trailer carrying two tons. The main route of the company is between Liverpool and Blackburn, a distance of about 40 miles, on which a regular service is to be run every night in both directions. In the daytime collections and deliveries will be made within 12 or 15 miles' radius of the two towns above named. The company is establishing its own machine shops for repairs and is also opening a station for light motor vehicles.

C. H. G.

LONDON, July 30.

#### Concrete Piles.

A new system of concrete pile construction has lately been perfected by Mr. A. A. Raymond, of Chicago. The method involves driving into the ground a sheet-iron shell of the size and shape of pile desired. A tapered steel core is used to accomplish this, the shell being fitted over this core and the whole driven as the ordinary wooden pile. The construction of this core is such that it may be contracted after the proper depth is reached, and withdrawn



Applications of Concrete Piles.

from the shell. The core is in three parts, an outer shell in halves, and a central tapered part having a head, the whole being held rigid by keys. When it is desired to withdraw the core the keys are removed, permitting the central tapered part to be raised a sufficient distance to allow the shell to collapse slightly, when the whole may be easily lifted out. The shell is then filled with concrete, which is carefully and continuously tamped as it is fed in, to prevent the formation of voids.

In a trial of this system made in Chicago the tapered steel core was 20 ft. long, 18 in. in diameter at the butt and 6 in. at the point. The hammer weighed 2,200 lbs. and the penetration for the last few blows was but an inch to the blow, with a fall of 25 ft. An oak pile 12½ in. at the butt and 10 in. at the point had a penetration of 5½ in. for the last blows, using the same hammer and drop, and driven only a few feet away. It was computed from these tests that the wooden pile had a carrying capacity of 17,000 lbs., while the concrete pile would carry 65,000 lbs. The greater carrying capacity of the concrete pile is, of course, due to its increased taper. This taper may be varied according to the nature of the material to be penetrated. The relative appearance of the two kinds of piles is shown in Fig. 1. A comparison of wooden and concrete piles for wall foundation work is shown in Fig. 2, the number of concrete piles being one-half that of the wood, while the bearing surface is nearly 39 per cent. greater. The Bryson building, Chicago, costing \$250,000, has concrete piles under its foundation after the manner shown in this illustration. The system used at the works of the J. I. Case Plow Works, Racine, Wis., is shown in Fig. 3. The ground on which this plant stands is of such character that some system of piling was necessary. The water level is so far below the level of the ground that by driving timber piling below the water line would have required an expensive filling of concrete from the piles to the surface.

It is possible to use the concrete piles for trestle work, two methods being illustrated by Fig. 4. Where the pile comes above the surface it is stiffened and strengthened by steel rods imbedded within its length from top to bottom, as shown. They may also be sway-braced by steel rods and concrete.

For docks it would seem that the concrete system should be especially desirable because of the permanency it insures. They are naturally more expensive than those of timber, but the latter can only be regarded as temporary. The illustration, Fig. 5, shows the construction, with concrete backing and anchorage.

The advantages of the concrete pile may be summarized as follows:

It is practically everlasting, the surrounding conditions of soil or water not affecting it.

The water line in the soil may be entirely disregarded, unlike timber piles, which must be cut off below this line to prevent decay. Solid foundations of considerable depth must be built on the wooden piling in order to reach the surface, involving a large amount of excavation. Use of concrete piles avoids this.

The concrete pile may be made with practically any desired taper, an increase of which is held to give increased supporting power.

Timber exposed to sea water must be renewed periodically as a result of the ravages of the teredo. Relief may be obtained from this difficulty through the use of the concrete pile.

The Raymond Concrete Pile Co., Chicago, is introducing the system.

#### Bridges of New York City.

The report of the Bridge Commissioner of New York City for six months ending June 30, was made public this week. There is not much of interest in it which is not already known.

Last May the Brooklyn Rapid Transit Company caused a count to be made of the passengers carried across the Brooklyn Bridge in 24 hours, and found the number to be 295,058, by both classes of cars. This was an increase of 11,994 over the number counted one day last September. Nothing definite is said about the prospect of improvement of the bridge.

Concerning the Williamsburg bridge (No. 2), the Commissioner informs us that all of the cable wires had been strung by June 30 last. All of the steel work of the Brooklyn approach has been erected except the buckle plate floors and the railing. On the Manhattan approach all the foundations have been completed and the masonry is well under way. There has been delay in getting the material of the suspended structure manufactured, but

In connection with these tests observations were made to determine the extent of the air resistance. Pipes of different diameters were passed through the front of the car and were connected inside to recording gages. These tests indicated that a uniform cone of compressed air was pushed ahead in front of the car, and that this cone had a length of about 11 ft. This latter length will undoubtedly vary with the size and shape of the front of the car. The following formula has been deduced from these experiments and shows the relation between the speed in miles per hour and pressure in pounds per square foot of car front.

$$P = .00265 V^2.$$

This relation holds approximately good up to speeds of 93 miles an hour.

It should be noted, however, that the pressure obtained from the above formula does not include the skin friction upon the sides of the car, but only the pressure upon the front end. A similar formula has been obtained by Mr. J. A. F. Aspinall (see *Railroad Gazette*, June 20, 1902, p. 468) from experiments made in England. He gives  $P = .003 V^2$ , which equation closely checks the one given above.

#### Water Tube Boilers in the British Navy.

The First Lord of the Admiralty in a speech before the House of Lords made a number of statements regarding the use of the Belleville water tube boilers. In the course of his remarks he said that in the British Navy many difficulties had been experienced with Belleville boilers, and that foreign navies apparently experienced but little trouble. In the French navy these boilers have been quite successful, and French engineers claim that the trouble with the English boilers is due to faulty construction. *Engineering* (London) says: "We fear it has been too much a characteristic of our countrymen to imagine that they need no instruction in engineering matters from foreigners; and having once adopted the principle of the Belleville boiler it was thought no one could teach us how to carry out the general idea in regard to detail."

It was admitted by the First Lord that it was not at first appreciated that Belleville boilers required much more attention than cylindrical boilers, and he, therefore, agrees with the verdict of the Boiler Committee in so far as they believe that much of the condemnation of this boiler is unjustified. He believes, however, that for the present it is not good policy to install any more of these boilers in ships because other types of water tube boilers are simpler in construction. In six cruisers recently built there is to be a combination of four-fifths water tube boilers and one-fifth cylindrical. Two of these ships are to have Yarrow boilers; two the Niclausse boilers; one the Durr boilers; and one the Babcock & Wilcox boiler.

It is acknowledged by the First Lord that there is a greater consumption of fuel in the case of the water tube boiler. Just what this excess is, it is hard to determine, but he would not put it down to less than 10 per cent., and in any case it is to be expected that water tube boilers will never give the same economy that can be attained with the cylindrical boiler.

The reason, therefore, for the use of the water tube boiler is purely a technical one, and the substitution of cylindrical boilers for water tube boilers in a ship of 25,000 h.p. would necessitate an addition of 1,500 tons and the loss of one knot in speed.

#### The Care of the Air-Brake.

BY F. M. NELLIS.

One of the subjects reported on at the Master Car Builders' Convention was "Standard Methods of Cleaning Air-Brakes etc." The Air-Brake Association appointed a committee to attend the Master Car Builders' Convention and to assist in the discussion and disposition of the questions raised. We give below a portion of the discussion by Mr. Nellis in the convention.]

Referring to the report, the first change that the Committee of the Air-Brake Association would suggest is where it refers to the removal of the internal parts of the brake cylinder for cleaning, and immersing these parts in kerosene oil. The Committee would suggest that not all of the internal parts be immersed in kerosene oil. They would except the leather packing, inasmuch as the immersion of the leather packing in kerosene oil will make the leather porous and allow the pressure to leak through. It will make it soft, of course, to immerse it in the oil, but it will also cause this additional trouble. The gaskets of the triple valves should not be immersed in kerosene oil; in fact, nothing that is made of leather or rubber.

The next point is the use of oil for the slide valve, triple piston packing ring and the bushing. The Air-Brake Association Committee instead of recommending any particular kind of oil, such as signal oil, would suggest a light-bodied, high grade quality of mineral lubricating oil because the term "signal oil" covers so many different things. What is signal oil in one part of the country is not necessarily signal oil in another part.

Regarding the renewal of the triple piston packing ring and the truing up of the bushing, the Air-Brake Association Committee believes that this is a refinement of work that cannot be done by the railroads themselves

#### Tests On the Berlin-Zossen Experimental High-Speed Line.

We have frequently spoken of the high speed electric railroad tests on the Berlin-Zossen experimental line. A very complete account of the tests made on this line last fall was given in a paper by G. B. Lochner on April 8, 1902, before the Berlin Society for Railroad Engineering.

It is stated in this paper that at a speed of 87 miles an hour the cars began to roll and vibrate, and at higher speeds these effects became more marked and serious, and the rails were considerably bent. The final tests were, therefore, made at speeds not exceeding 80 miles an hour.

Great difficulties were encountered at these speeds in rapid and effective braking. Mr. Lochner lays great stress on the importance, if maximum braking efficiency is to be obtained, of removing in so far as possible all difference in pressure between the air pipe and the brake cylinder, and in arranging the pressure-reducing valves so that the decrease of air pressure in the brake cylinder during the time of braking is proportionate to the decrease of speed. [The Westinghouse high-speed brake, in fact.—EDITOR.] Such an arrangement would always give the maximum braking efficiency without danger of skidding the wheels. In the tests the brake-shoes and wheels became so hot that the brake-shoes were filled with water for artificial cooling. [Probably the water was circulated through the shoe.] This had little effect, the final suggestion being, that the shoes should be so arranged as to act upon a specially provided disc mounted upon the axles.

satisfactorily, and that it will be much better to let that part of the work go to the manufacturers.

The Committee would recommend that in taking down and replacing the emergency parts of the triple, great care be used because experience has proved that the parts of the triple are frequently injured by being taken down in a careless manner by inexperienced workmen. We are finding quite a lot of that.

The next thing is the avoidance of home-made gaskets and leather packings. The leather packings as furnished by the manufacturer are specially treated and made to hold the air pressure. We find that the home-made article is not always of high grade.

Another point is the lubrication of the brake-cylinder. The Air-Brake Association Committee would suggest that the parts be not soaked in kerosene as before mentioned, but that a lubricating grease be spread over the walls of the cylinder and also on the leather, and that a liberal amount be placed on the packing ring and the adjacent side of the packing leather; the idea being to permit the air pressure to force this lubricant into the pores of the leather and give it longer life.

The M. C. B. Committee suggest that when the expander ring is removed from its position in the piston and the packing leather, the ends stand apart from  $1\frac{1}{4}$  in. to  $1\frac{1}{2}$  in. The Air-Brake Association Committee suggest that the ring be of a circumference that will neatly fit the cylinder when the ring is removed and placed in the cylinder. We find that repairmen in trying to make this ring stand apart at the ends the distance recommended by your Committee, get it out of shape and constantly allow the pressure to leak out. It does not press uniformly against the sides of the cylinder. Our Committee also suggests that the old stencil stamps be removed from the brake cylinder when the new ones are put on.

The next, and the last matter in the first half of this paper is the key to the schedule of prices. The Air-Brake Association Committee balked a little at first on this key, but after careful study and consultation it came to the conclusion that the key was a very good thing indeed; in fact, the best thing which had been presented to it, and it heartily endorses the key to the schedule of prices. There may be some little irregularities; some may be too cheap and others may be too high, but that will probably be worked out during one year's trial.

#### A New Locomotive Searchlight.

The Rushmore Lens-Mirror searchlight shown in the accompanying engravings is a departure from the locomotive headlight using a polished metal reflector, being constructed on the same optical principles as the marine searchlight. It consists of a round metal drum in the rear end of which is mounted a 12 in. aplanatic lens-mirror, and at the front end a plane-glass door. The mirror is a deep bowl-shaped lens accurately ground and polished and having its posterior surface silvered. The radius of the front surface is shorter than that of the rear surface; this difference being calculated to compensate the effects of spherical aberration. The result is that if a source of light infinitely small were placed in the focus the projected beam would have no spread at all and at long range would be no larger than at the



Standard Lens Mirror Searchlight.

lens. With the modern searchlight, the source of light is of appreciable size and therefore out of the true focus of the lens, hence the spreading of the beam and large area of illumination.

The electric arc does not give, with the aplanatic lens-mirror, a sufficient spread of the projected beam. The source of light is small and the rays are projected with great intensity over a small area. The makers of the Rushmore headlight after careful experimenting have found that the large flame produced with an acetylene gas burner gives the most satisfactory results. The rays are projected not in a narrow concentrated field as with the electric arc, but over an area covering the entire right-of-way at about 500 ft. distance. While of sufficient intensity to show up cars on sidings 1,500 ft. ahead, it has not the blinding effect of the electric arc.

Where the service demanded is light, an Elliot acety-

lene generator is recommended, but where the service is continuous the storage system under pressure in tanks containing acetone is preferred as being more reliable. The lamps are supplied with a  $2\frac{1}{2}$  ft. burner with a nominal rating of 300 candle power.

A number of engines on the Central Railroad of New Jersey equipped with these lights and 800 ft. storage tanks are proving satisfactory in service. The Rushmore Dynamo Works, Jersey City, N. J., are the makers.

#### Mobile Coaling Plant.

The accompanying photograph illustrates the new coaling plant of the Southern Railway Company at Mobile, Ala. It was installed by the C. W. Hunt Co., New York, in April, 1901.

The building is 140 ft. long, 30 ft. wide and 70 ft. high. It contains 12 separate storage bins, two of which will hold  $126\frac{1}{2}$  tons each, and the other 10 will hold  $147\frac{1}{2}$  tons each, giving a total storage capacity of 1,727 tons to the 12 bins. These bins were con-

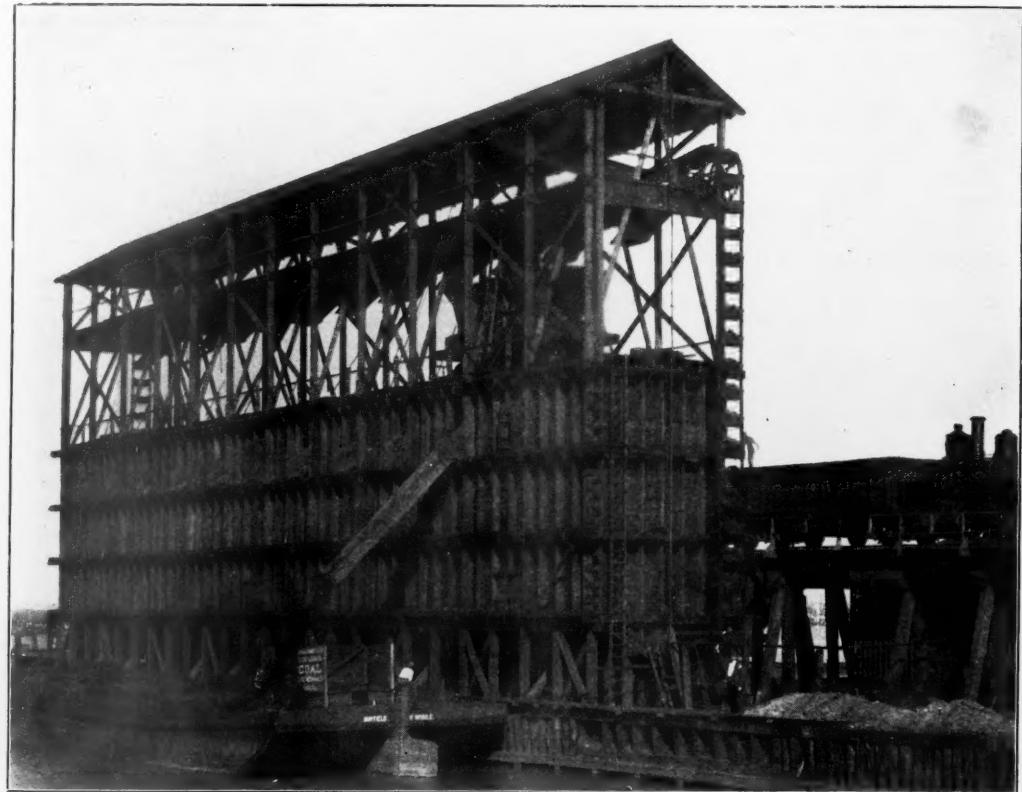
structed alongside the elevator building. The coal is discharged from them and passes down through bin and valve into filler, thence to buckets attached to chain, and is then conveyed to third floor and dumped by means of a mechanical arrangement. It then passes down through chute and hopper, which is set upon scale car, and thence through valves into barges, vessels or storage bins as the case may require. It is stated that very little coal is broken in handling.

We are indebted to Mr. F. S. Gannon, Third Vice-President of the Southern Railway Co., for the above information.

#### TECHNICAL

##### Manufacturing and Business.

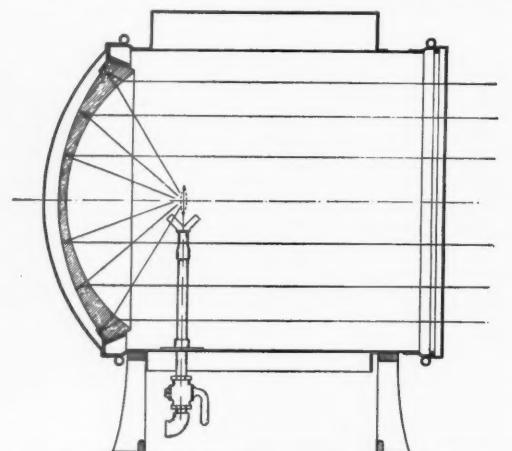
The contracts for the new plant of the Cleveland Pneumatic Tools Company have been awarded to Messrs. J. A. Reaugh & Son, of Cleveland, Ohio. It is expected to have the plant completed and ready for operation within 90 days.



Coaling Plant of the Southern Railway Company at Mobile, Ala.

structed to afford storage room for coal which was previously held in cars, often as long as 100 days. Car service rules, however, are now in effect at Mobile, and free time of storage is reduced to 10 days.

There are 13 iron chutes, including three telescope



Showing Principle of the Aplanatic Lens Mirror.

chutes, which are used for discharging coal from the structure or bins into vessels. The telescope chutes can be adjusted to suit any width of barge or vessel, ranging from 20 to 40 ft. One of these telescope chutes is at the east end of the conveyor, which makes it possible to load a craft at that point as well as in the slip alongside the conveyor building.

The conveyor is steam driven and consists of one movable filler, 24 double flat tunnel valves, 12 dumpers, two 24 in. cut-off valves and 15 single flat valves with operating levers, chain and counterweight. The chain is equipped with 150 buckets, and, at its present speed, makes a revolution every 10 minutes, or six revolutions per hour. The buckets when filled will average 270 lbs., but when they are heaped they will hold more, making the average capacity of the hoist 150 tons per hour.

Loaded cars are placed on the  $16\frac{1}{2}$  ft. elevated trestle

The Allier whitewashing machine, made by the C. L. Bastian Mfg. Co., Chicago, can replace 24 men using brushes, so the builders claim, and requires but two men for the operation. One pump has a capacity of 18,000 sq. ft. per day, and it is said the cost is only about 4 cents a sq. ft. The company has a long list of users of this apparatus, including concerns that have a great amount of whitewashing to do each year.

The National Brass Mfg. Co. has recently moved from Kansas City, Mo., to Armourdale, Kan., where the capacity of the former plant has been increased 300 per cent., the capital stock of the company having been increased from \$35,000 to \$75,000 fully paid up. A. P. Prier is President; W. F. Prier, Vice-President, and Jas. P. Sprague, Secretary and Treasurer. The new factory is at 617-621 Adams street, the products being principally railroad lanterns, brass and bronze castings.

At a meeting of the stockholders of the Locomotive Appliance Company, held in Chicago, Wednesday, Aug. 6, the general office of the company was removed from Chicago to St. Louis, with headquarters in the Columbia Building. Messrs. B. F. Hobart, C. A. Thompson, C. H. Howard, J. J. McCarthy, J. B. Allfree, Robt. Shriver, E. B. Lathrop, Davis Olney, Ira C. Hubbell were elected Directors, and at the Directors' meeting Ira C. Hubbell was elected President; C. A. Thompson, First Vice-President; C. H. Howard, Second Vice-President; J. J. McCarthy, Third Vice-President; E. B. Lathrop, Treasurer; W. H. England, Secretary.

Westinghouse, Church, Kerr & Company have under contract for the Metropolitan Street Railway, New York, the designing of the entire Kingsbridge Station and the installation of boiler, engine, condenser and generator equipment. This station contains one of the largest aggregations of power generating machinery in the country. Also for the Lackawanna & Wyoming Valley Railroad the designing and construction of one of the most important high speed interurban roads in the country; for the American Car & Foundry Co., Berwick, Pa., the erection of a car manufacturing establishment similar to that just completed for the same concern at Detroit, Mich., and for the Pittsburgh & Lake Erie Ry. at McKees Rocks, Pa., the complete mechanical equipment for the large railroad shops and terminal station now building at this point.

Negotiations have been progressing for some time for the transfer of the European patents now owned by the Philadelphia Pneumatic Tool Co., to a syndicate strong in shipbuilding and railroad interests in England and Germany. Mr. J. W. Tierney, President of the Philadelphia Pneumatic Tool Co., will shortly sail for Europe to conclude these arrangements. It is stated that the company will increase its capital stock to \$2,000,000 in order to take care of growing business and to prosecute extensions, especially abroad. The company reports an unprecedented business. The increasing demand for the Keller rotary drill is a particularly noticeable feature. Four eastern steel companies have recently purchased Keller tools to the aggregate number of 237. A western railroad has recently made a contract with the Philadelphia Pneumatic Tool Co. to purchase at least 1,500 Keller tools within the next eight months. A cable order for Keller tools was received last week from Bilbao, amounting to several thousand dollars.

#### Iron and Steel.

The American Bridge Co., of New York, has been authorized to do business in Ontario, with a capital of \$100,000.

The Lookout Mountain Iron Company, with \$125,000 capital, was chartered in Tennessee recently by M. S. Gibson, C. A. Syrley and others.

The Coshocton Iron Co. gives notice of intended incorporation in Pennsylvania. C. E. M. Champ, Wm. E. Marquis and S. E. Hare are interested.

The plant of the Troy Steel Co., Troy, N. Y., was sold at auction in Albany on Aug. 7. A. F. Donovan, of St. Louis, was the successful bidder at \$525,000.

S. A. Burr, formerly with the New York office of the Pennsylvania Steel Co., has accepted the position of General Sales Agent of the Tennessee Coal, Iron & Railroad Co., with office at 100 Broadway, New York.

Geo. D. Devitt, for 20 years Superintendent of the Mabel blast furnace, Sharpsville, Pa., has resigned to become Superintendent of the Shenango Company's three blast furnaces, succeeding Geo. L. Collard, who goes to Clairton as Superintendent of the Clairton Steel Company's new furnaces.

John J. Cone, of Robert W. Hunt & Co., has returned to Europe in the interest of his firm, who have charge of the inspection of most of the American rail orders placed abroad as well as many other large orders, such as billets, structural material, etc. The company has opened a permanent office in London, at 32 Norfolk House.

The Valley Iron Company has been formed in Birmingham, Ala., with a capitalization of \$1,000,000 for the purpose of developing the interests along the Alabama Great Southern Railroad between Valley Head, Ala., and Sulphur Springs, Ga. The temporary officers are James Bowron, President; G. B. McCormack, Vice-President, and Erskine Ramsay, Secretary-Treasurer.

Julian Kennedy, of Pittsburgh, and Axel Sahlin, of Millom, Cumberland, Eng., manager of the blast furnaces of the Millom & Askam Iron Co., will form a partnership and open offices in London as consulting engineers for iron and steel works. Mr. Sahlin was in the United States last year as a member of the British Iron Trade Association's Commission on the American iron and steel industry.

Of the recent large orders placed for rails for delivery in 1903, it is said that 100,000 tons are for the Southern Pacific and Union Pacific interests. Of this, 40,000 tons have been placed with Continental mills as American mills were not able to meet the requirements to deliver the full order. Other orders for delivery in the early part of next year will have to be placed abroad, as our mills are now said to have already booked orders for 1,600,000 tons for delivery next year, including 400,000 tons left over from the current year. Other California parties have just placed 10,000 tons with German mills. The following are some of the large orders that have been placed for next year. Several have been previously mentioned: Pennsylvania, 207,000 tons; Burlington, 50,000 tons; Atchison, 50,000; Illinois Central, 50,000; Baltimore & Ohio, 40,000; Northern Pacific, 40,000; Rock Island, 30,000; Norfolk & Western, 24,000; Missouri, Kansas & Texas, 10,000 or 15,000 tons.

#### Buffalo & Susquehanna Iron Co.

William A. Rogers, president of the Buffalo & Susquehanna Iron Company, locally known as the Rogers-Goodyear Co., now about to build its plant at South Buffalo, has said that the pig-iron furnaces will be in operation late in 1903. The contract for the two large blast furnaces for the plant has been let to the Riter-Conley Company, of Pittsburgh. They will be 22 x 80 ft., with four hot-blast stoves to each furnace. Their capacity will be from 600 to 800 tons of pig iron daily. The next contract to be let will be for the blowing engines. The concern intends to build a slip a half mile long and 100 feet wide, with a depth of 27 feet. Julian Kennedy is Consulting Engineer and his brother, Hugh A. Kennedy, is General Manager.

#### The Ohio River Bridge at Marietta.

On page 546 of the *Railroad Gazette* of July 11, appeared a description of a Marietta bridge in the course of which we said "The assumed live load for the floor throughout and for the plate girders in the viaduct is 80 lbs. per sq. ft., or an eight-wheel electric car of 20 tons. . . ."

This should have been an electric car of 30 tons. The *Railroad Gazette* is not responsible for this error.

#### Electric Traction on British Railroads.

We are informed officially that the North Eastern Railway is about to convert certain of its lines in the neighborhood of Newcastle to electric traction with a view to meeting the severe competition that is now encountered from the Corporation and other tramways. As these tramways are said to carry some 800,000 persons weekly it is a matter of great importance in some way to stop the decrease in traffic caused by this competition. The motors are being built at the Gateshead works of the company and are to be run by accumulators.

#### American Steel Foundries Company.

The organization of the American Steel Foundries Co. was completed on July 31, when officers were elected as follows: President, Joseph Schwab, brother of Charles M. Schwab, president of the United States Steel Corporation; First Vice-President, Daniel Eagan; Second Vice-President, Clarence H. Howard; Secretary and Treasurer, F. E. Patterson; General Counsel, Max Pam; Executive Committee, Joseph E. Schwab (Chairman), Daniel Eagan, E. F. Goltra, George B. Leighton, Eben B. Thomas, Clarence H. Howard, Max Pam. The directors are: Joseph E. Schwab, Eben B. Thomas, chairman Erie Railroad; William C. Brown, vice-president of New York Central; J. M. Schoonmaker, vice-president Pittsburgh & Lake Erie; Alfred Clifford, director United States Steel Corporation; S. R. Callaway, president American Locomotive Company; William K. Bixby, chairman American Car & Foundry Company; Max Pam; Leslie D. Ward; Edward Shearson; Charles Miller, president Galena Oil Company; Lewis Nixon, president United States Shipbuilding Company; Daniel Eagan; George B. Leighton, president Leighton & Howard Steel Company; E. F. Goltra, president American Steel Foundry Company; Clarence H. Howard, vice-president Leighton & Howard Steel Company; W. D. Sargent, president American Brake Shoe & Foundry Company; Arthur J. Eddy, Howard K. Wood, Kenneth K. McLaren and Donald H. Mann. The consolidation includes the American Steel Casting Company of New Jersey, which embraces several plants in Pennsylvania and Ohio; the Reliance Steel Casting Company, Limited, of Pittsburgh; the Leighton & Howard Steel Company, St. Louis; Franklin Steel Casting Company, Franklin, Pa.; the Sargent Company, Chicago, and the American Steel Foundry Company, St. Louis.

#### Harbor Works.

Bids are asked until Sept. 30 for building an outer harbor in Light's Passage, located at the entrance to Port Adelaide River, South Australia. The proposed works will comprise approximately 4,250,000 cubic feet of dredging in limestone, sand and clay, and the construction of 1,500 feet of wharves and stone revetment walls in connection therewith for the berthing of steamships in the harbor; also the reclamation of an extensive area of foreshore with the dredged materials. Hallerdale Granger, the Agent-General for South Australia, 1 Crosby square, London, E. C., will furnish the necessary specifications. The fee is £5 per set, which, however, is returnable on receipt of a bona fide tender.

The Governor-General of Indo-China has authorized the construction of a harbor at Haiphong to include a quay 1,800 ft. long; sheds, graving docks, 650 ft. long; dredging, etc., to cost about \$4,200,000.

#### The New Westminster Bridge.

We have received from Messrs. Waddell & Hedrick, Consulting Engineers, Kansas City, Mo., blue prints showing the substructure of an important bridge to be built at New Westminster, British Columbia, over the Fraser River. This is to be a railroad and highway bridge and is to be built for the Provincial Government. We judge from the blue prints that there are to be eleven piers. The deepest of these is 147 ft. 8 1/16 in. from the bridge seat to the cutting edge. The crib itself is 115 ft. deep and 40 ft. x 22 ft. at the foot. This is pier No. 3. No other pier goes to such depth. The masonry is to be of granite face stone, with concrete backing in all shafts of river piers. The abutments and shore pedestals with the approaches will be of concrete throughout. The total cost of the structure will be \$750,000, and it should be finished by May, 1903. The Dominion Bridge Company, of Montreal, has the contract for the superstructure, including the timber approaches, and Messrs. Armstrong, Morrison & Balfour, of Vancouver, B. C., have the contract for the substructure.

#### Pennsylvania Steel Bonds.

At a special meeting of the stockholders of the Pennsylvania Steel Company, on Aug. 12, an issue of \$7,500,000 5 per cent. 30-year bonds was authorized, to provide funds to pay for the Cornwall Iron Ore banks, blast furnaces at Lebanon, Pa., and a controlling interest in the Cornwall & Lebanon Railroad. They will be secured by a first mortgage on these properties, which were bought at the time the Pennsylvania Steel Company was reorganized in May, 1901. The new bonds will also pay for the construction of coke ovens at Lebanon, with an output of about 600 tons a day, or about enough to supply the Pennsylvania Steel Company's furnaces there with fuel.

#### The Cab Signal.

The Miller cab signal is being installed in the New York Central's Park avenue tunnel, and on certain of the engines running through that tunnel. We are not yet informed how far the company expects to go in this installation. Presumably that will depend upon the results of some experience.

#### The United States Shipbuilding Company.

On Monday of this week the various shipbuilding plants which are to form the United States Shipbuilding Co., were transferred to the new concern: The Bethlehem Steel Co. was taken over on Tuesday. The capital of the new company has been increased from \$20,000,000 to \$45,000,000. The original issue of \$16,000,000 5 per cent. first mortgage bonds will stand, but another bond issue is planned in connection with the acquisition of the Bethlehem Steel Co. The plants consolidated are the Bethlehem Steel Company, Union Iron Works, San Francisco; Bath Iron Works, and Hyde Windlass Company, Bath, Me.; Eastern Shipbuilding Company, New London, Conn.; Harlan & Hollingsworth Company, Wilmington, Del.; Crescent Shipyards, Elizabeth, N. J.; Samuel L. Moore & Son Company, Elizabeth, N. J., and the Canda Manufacturing Company, Carteret, N. J. Mr. Lewis Nixon, one of the officers of the company, has said: "The United States Shipbuilding Company can now make proposals for a complete vessel, armor, guns, forgings, machinery and hull. No other plant either here or abroad can do this, although some do produce ship and guns. The company is to-day building the largest cargo-carrying steamers in the world, and has a fleet in course of construction of the value of \$37,000,000 and the total contracts in hand aggregate \$50,000,000."

#### THE SCRAP HEAP.

##### Notes.

There will be a general increase in the wages of trainmen on the Burlington System, beginning Sept. 1.

The Great Northern Railroad has followed the example of the Illinois Central and the Southern in the movement to educate people as to the needs of better roads, and the possibility of getting them. A "good roads" train has been arranged for demonstration and instruction.

The announcement has been made that the Baltimore & Ohio will, beginning Sept. 1, divert from the Western Maryland Railroad the freight now delivered to it at Cherry Run. This freight will go over the Cumberland Valley Road. This action is not surprising, but has been long expected, and it is a perfectly obvious thing to do.

There are persistent rumors that in the Western Passenger Association territory restrictions of passes, similar to those in the Eastern territory, will be put in effect. This will doubtless be followed by a similar arrangement in the Central passenger territory. The one serious trouble we have heard of in keeping up the agreement in the East, is from railroad officers who are too fond of the politicians. Such officers give a good deal of trouble.

##### Mr. Daniels on Railroads.

On the 11th Mr. George H. Daniels, General Passenger Agent, delivered an address before the Chautauqua Assembly, at Chautauqua, on "American Railroads and Our Commercial Development." Mr. Daniels presented many important and striking facts, statistical and social, and presented these facts in a picturesque and impressive way. From the address we get the following:

"On June 30, this train of five heavy cars [20th Century Limited] ran a distance of 139 miles in 131 minutes on the Mohawk Division of the New York Central; this is an average speed of 63.66 miles per hour. Recently the 20th Century Limited on the Lake Shore covered the 134 miles between Brocton and Cleveland in 131 minutes. From Cleveland to Toledo the engineer pushed along over the 113 miles in 103 minutes, reaching a speed of 90 miles an hour at some points."

##### The Crops.

The monthly report of the statistician of the Department of Agriculture shows the condition of corn on Aug. 1 to have been 86.5, as compared with 87.5 on July 1, 1902; 54 on Aug. 1, 1901; 87.5 at the corresponding date in 1900, and a 10-year average of 84. The statistician estimates the winter wheat crop at about 380,000,000 bushels, or an average of 13.8 bushels per acre. The average condition of spring wheat on Aug. 1 was 89.7, as compared with 92 last month; 80.3 on Aug. 1, 1901; 56.4 at the corresponding date of 1900, and a 10-year average of 80. The average condition of oats was 89.4, against 92.1 last month; 73.6 on Aug. 1, 1901; 87 at the corresponding date in 1900, and a 10-year average of 82.2. Mr. J. C. Brown, statistician of the New York Produce Exchange, calculates on the basis of the Government report an indicated winter wheat crop of 374,021,000 bushels, against the indication on July 1 of 352,339,000 and yield at harvest last year of 429,675,140. Spring wheat's indicated crop is 272,590,000 bushels, against 181,161,000 on July 1 and 318,785,078 at last year's harvest. This makes the total indicated wheat yield 646,611,000 bushels, against 633,500,000 indicated on July 1 and 748,460,218 at harvest in 1901. Last year's wheat harvest was the greatest on record. Mr. Brown calculates the indicated corn crop at 2,561,490,000 bushels, against an indication on July 1 of 2,589,951,000 bushels and a yield at harvest last year of 1,522,519,891 bushels. The crop promises to be close to the record, if not the greatest.

##### The Chicago & Alton Employment Bureau.

Mr. W. A. Freese, in connection with his duties as Superintendent of Telegraph of the Chicago & Alton, will continue the operation of the Employment Bureau, the purpose of which will be to meet the citizens living in and adjacent to communities through which the road passes. Inasmuch as there are many young men who would like to become employees he will get their record, habits, character, etc., in view of fitness to enter any department of this company, should they so desire. It is the wish of the management to recruit its employees from among the people living along its line, so that the interests of the community served by this company may be identical with those of the road. Mr. Freese will receive applications from desirable young men for positions as students in telegraph offices, clerks in any departments, operators, brakemen, firemen, etc., and a record will be kept from which departments may make selections.

##### A Usual Run on the Reading.

The little table below gives some facts of a run which

is made every day, and, indeed, several times a day. Times were taken for 14 consecutive miles, between Trenton and Wayne Junction, and the table gives the seconds for each mile, the deduced rate in miles per hour, and, finally, the average for 14 miles. It will be seen that these 14 miles were run at the rate of 73.9 miles per hour. The train was Baltimore & Ohio train No. 507, which leaves Jersey City at 1:12 p.m., and is a heavy train with a dining car. The times were taken with an ordinary watch. Anybody who has ever tried to do that kind of timing knows that at such speed it is not possible to be accurate. Consequently, the column of seconds and the column of rates doubtless seem more ragged than they actually were; but the average for 14 miles eliminates all material error.

Seconds.	Rate, M. P. H.
54	67
47	76 $\frac{1}{2}$
47	76 $\frac{1}{2}$
46	78
46	78
48	75
51	70 $\frac{1}{2}$
54	67
52	69
48	75
44	82
50	72
44	82
Total.. 685	Average.. 73.9

#### Train Robbers in Illinois.

On the night of August 5 a train of the Chicago, Burlington & Quincy was stopped by robbers, near Savanna, Ill., and the express car was blown open and robbed of something over \$2,000. One of the robbers appears to have been shot and killed by one of his comrades, whether by accident or not, is not known. A statement given out by the railroad company says:

"Train 47 was held up last night at about 11:30 at South Switch, Marcus, about 10 miles north of Savanna, Ill. The switch was turned for passing track, and the train flagged. The two head cars, consisting of a mail and express car and a composite car, were cut off and taken to the north switch, where the safe in the express car was blown open with dynamite, and contents taken, after which the engine was cut off by the robbers and started north. As the robbers left, the express messenger fired at them. One robber was found dead about one mile north of Marcus, and his body was given over to the coroner. At least six men were concerned in the robbery. So far as is known only \$2,000 in silver was secured. None of the crew was hurt, and none of the passengers molested. The express end of the rifled car was badly damaged." Announcement was made by the officials of both the Burlington road and the Adams Express Company that a purse of \$1,000 would be made up by the two companies and given to Express Messenger Byl for his bravery.

#### Lake Commerce at Sault Ste. Marie, Month of July.

Eastbound:	
Copper, net tons.	18,748
Grain, bushels	356,015
Flour, bbls.	981,732
Iron ore, net tons.	3,878,666
Lumber, M. ft. B. M.	165,926
Wheat, bushels	4,339,236
General merchandise, net tons.	24,545
Passengers, number.	5,686
Westbound:	
Coal, soft, net tons.	602,559
Manufactured iron, net tons.	22,410
Salt, bbls.	76,747
General merchandise, net tons.	86,584
Passengers, number	5,290
Freight:	
Eastbound, net tons.	4,357,545
Westbound, net tons.	724,853
Total freight, net tons.	5,082,398
Vessel passengers, number.	3,276
Registered tonnage, net tons.	4,470,345

#### Bids to Build a South American Railroad.

On Aug. 31 the Department of Public Works at Buenos Ayres will receive bids to build a railroad from Jujui to La Quiaca, on the frontier of Bolivia, the bids to include grading, track laying, building, rolling stock, telegraph lines, etc. Each bidder is required to make a deposit of 50,000 pesos in the Banco de La Nacion, Buenos Ayres, subject to the order of the Department of Public Works, which will be returned if the bid is not accepted. Within three days after the successful bidder has been notified, he shall increase the deposit to 100,000 pesos, bids to contain a complete list of the prices in gold of the work to be done and material employed. The railroad must be built in accordance with plans furnished by the Government, and the Government has a right to inspect the materials and the work done. Materials, etc., used on the line will be admitted free of duty. Work must begin within three months after the bid is accepted, and the line must be completed and delivered to the Argentine Government on Sept. 1, 1904. Payment for the building and equipment of the line will be made in 4½ per cent. interest bearing Government bonds, secured by the Northern Central R. R., from San Cristobal to Tucuman; the section from Patquia to Rioja, and the Andine R. R. from Villa Mercedes to Toma. The length of the line will be about 182 miles.

#### The North-Eastern's Ten-Wheelers.

In the issue of June 20, page 405, in the article on the 10-wheel locomotives of the North-Eastern, there are some errors in the figures. The distance between York and Edinburgh is given as 124 miles—being the North-Eastern's section of the famous East Coast Route between London and Edinburgh. This should be 205 miles. The distance between Edinburgh and Newcastle is 124½ miles, which is run without a stop by many of these trains, both ways. The trains are never 350 tons of cars, but average from 275 to 320 tons.

#### The Union Station at Buffalo.

The train shed at Exchange street, Buffalo, is being torn down, the structure having been condemned as unsafe. We understand that the company (the New York Central) is to build shelters, one over each of the platforms between the tracks, and that the project of building a new union station, which has been agitated by some of the people of the city for several years, is no nearer consummation than it has been for the last year.

#### LOCOMOTIVE BUILDING.

W. B. Isaacs is having a locomotive built at the H. K. Porter Works.

The Atchison, Topeka & Santa Fe is having 15 locomotives built at the Baldwin Works.

The Chicago, Rock Island & Pacific is having 10 locomotives built at the Brooks Works.

The Cincinnati, New Orleans & Texas Pacific is having 10 locomotives built at the Baldwin Works.

The Mathieson Alkali Co. is having eight locomotives built at the Rhode Island Works of the American Locomotive Co.

The Mexican Railways is having four locomotives built at the Dickson Works, in addition to the order reported in our issue of July 5.

The El Paso & Rock Island has ordered six consolidation locomotives from the Baldwin Locomotive Works for September and October delivery, and four Prairie type engines from the same company, to be delivered in September. The consolidation locomotives are simple, weighing 182,000 lbs.; weight on drivers, 161,000 lbs.; cylinders, 22 x 28 in.; diameter of drivers, 57 in.; straight boilers, with working steam pressure of 200 lbs., and 366 charcoal iron tubes. These are 15 ft. 1 in. long and have an outside diameter of 2 in. The fire-boxes are of carbon steel, 108 in. long and 66 in. wide; tank capacity for water, 6,000 gal.; coal capacity, 10 tons. Special equipment includes hammered steel axles, Sterlingworth brake-beams; Leeds and Tower couplers, Friedman No. 10 injectors; United States piston rod and valve rod packing, Crosby safety valves, Leach sanding devices, Nathan triple sight feed lubricators, French springs, Crosby steam gages. Standard driving wheel tires, Boise steel truck wheel tires and chilled tender wheel tires. The Prairie type engines will weigh 139,000 lbs., which will be 69 in. in diameter.

The New York Central & Hudson River has ordered 45 locomotives from the American Locomotive Co. Fifteen of these are compound, weighing 195,000 lbs., engine only; 168,000 lbs. on drivers; cylinders, 23 and 35 in., with 34 in. stroke; diameter of drivers, 63 in.; radial stay boilers with working steam pressure of 210 lbs., and 396 tubes of Shelby steel; fire-box of carbon steel, 96 in. long and 75% in. wide; tank capacity for water, 6,000 gal.; coal capacity, 10 tons. Fifteen of the engines are tandem compound weighing 225,000 lbs., engine only; weight on drivers, 200,000 lbs.; cylinders, 16 x 30 in., with 30-in. stroke; diameter of drivers, 51 in.; radial stay boilers with working steam pressure of 210 lbs., and 526 tubes of Shelby steel; fire-box of carbon steel, 105 in. long and 79½ in. wide; tank capacity for water, 7,000 gal.; coal capacity, 12 tons. The special equipment for both types of engines includes Midvale steel axles, Westinghouse air-brakes, Sansom bell ringers, National hollow brake-beams, Lappin flanged brake-shoes, Gould couplers, 16-in. headlights, Monitor injectors, U. S. metallic piston rod and valve rod packings, Leach sanding devices, Nathan sight feed lubricators, French springs, and 6½ in. Utica steam gages. Specifications for the remaining 15 engines are not yet at hand.

The New York, New Haven & Hartford is having 30 locomotives built at the Rhode Island works of the American Locomotive Co., for December, 1902, and January, 1903, delivery. Fifteen of these are simple 10-wheel, weighing 122,000 lbs.; weight on drivers, 93,000 lbs.; cylinders, 19 x 26 in.; diameter of drivers, 57 in.; extended wagon top boilers, with working steam pressure of 160 lbs., and 228 charcoal iron tubes, 13 ft. 9 in. long. Length of fire-box, 85 in.; width, 40 in., made of open-hearth fire-box steel; tank capacity for water, 4,000 gal.; coal capacity, eight tons. The other 15 engines are simple mugs, weighing 154,000 lbs., of which 132,000 lbs. is on the drivers; cylinders, 20 x 28 in.; diameter of drivers, 63 in.; extended wagon top boilers, with a working steam pressure of 200 lbs., and 308 charcoal iron tubes, 13 ft. long; fire-boxes of open-hearth fire-box steel, 102 in. long and 62 in. wide; tank capacity for water, 5,500 gal.; coal capacity, 10 tons. The special equipment for both classes of engines includes Westinghouse air-brakes, Midvale axles, Keweenaw brake-beams, Diamond "S" brake-shoes, Tower couplers, Sherburne headlights, Metropolitan injectors, Jerome piston and valve rod packings, Consolidated safety valves, Leach sanding devices, Nathan sight feed lubricators, French springs, Ashcroft steam gages, Midvale steel driving wheel tires and Page truck and tender wheels.

#### CAR BUILDING.

The Boston & Maine, it is rumored, is in the market for new equipment.

The Vera Cruz & Pacific has ordered two coaches from the American Car & Foundry Co.

The Northern Pacific is reported to have ordered six dining cars from the Pullman Company.

The Chicago, St. Paul, Minneapolis & Omaha is having seven coaches built at the Pullman Works.

The Oregon Short Line has ordered 15 coaches and five baggage cars from the American Car & Foundry Co.

The United Fruit Co. has ordered 60 box cars, two coaches and three cabooses from the American Car & Foundry Co.

The Campbell Creek Coal Co. is having 20 freights built at the Huntington Works of the American Car & Foundry Co.

The Duluth & Iron Range is reported in the market for a large number of 100,000 lbs. steel and 60,000 lbs. capacity freight cars.

The National of Chihuahua has ordered three third-class coaches and one combination baggage, mail and express car from the American Car & Foundry Co.

The Pittsburgh & Lake Erie has ordered 10 coaches and 15 cabooses from the American Car & Foundry Co., in addition to the order reported in our issue of June 13.

The East St. Louis & Suburban has ordered 10 hopper cars from the American Car & Foundry Co., in addition to the order reported in our issue of August 1st.

The Lake Shore & Michigan Southern has ordered two 70-ft. dining cars for November delivery from the Barney & Smith Co. These cars will be similar in construction to other cars now in their service.

The Tennessee Copper Co. was reported in our issue of July 25 as being in the market for 100 ore cars. The question of building such cars at its own shops has been under consideration, but has been indefinitely postponed.

F. M. Hicks has sold miscellaneous flat cars, rebuilt at the Hicks Locomotive & Car Works, to Kallahan Bros. & Katz, contractors of Omaha, Neb., and the American Sheet Steel Co., the Wise Terminal Co., the Western Ohio and Louisiana & Arkansas Railroads.

The El Paso & Southwestern let contract on July 23 to the South Baltimore Car Works for 25 box cars of 80,000 lbs. capacity for Sept. 2 delivery. Length of cars, 40 ft. 1½ in. over all; width, 9 ft. 7 in. over all; extreme height, 14 ft. to be built of wood with wooden underframes. The special equipment includes steel axles,

combination oak and iron bolsters; truck, 10½ in. x 13 in.; body, 5 x 15 in.; Westinghouse air-brakes; M. C. B. brasses; pocket attachment draft rigging, and Chicago old-style roof.

#### BRIDGE BUILDING.

ANDREWSVILLE, ONT.—The county councils of Grenville and Lanark will build a steel bridge over the Rideau River at this place.

ARMOUR, S. DAK.—Bids are wanted Sept. 1 for three steel bridges. John W. McKee, County Auditor.

BINGHAMTON, N. Y.—Bids are wanted Aug. 19 for the bridge over Park Creek at Cross street.

BOSTON, MASS.—The contract for building the abutments and approaches for Wellington Bridge, Middlesex Fells Parkway, in Somerville and Medford, has been awarded by the Metropolitan Park Commission to Lawler Bros., whose bid was \$42,780. The other bids were: Jones & Meehan, \$57,082.80; Coleman Bros., \$55,850; Connors Bros., \$51,323; William L. Miller, \$45,923; W. H. Ellis, \$44,960; Wilson & Jubb, \$42,433. (Aug. 1, p. 614.)

BRATTLEBORO, Vt.—Contract for building the steel bridge over the Connecticut River between Brattleboro and Hinsdale has been let to the United Construction Co. of Albany, N. Y., for \$25,000.

BROOKLYN, N. Y.—Announcement has been made of the plans of the Long Island R. R. Co. to do away with the grade crossings in several of the larger towns beyond Jamaica.

CALDWELL, IDAHO.—As previously stated in this column, bids are wanted Sept. 9 for a two-span steel and wooden 325 ft. bridge by Edgar Meeks, County Clerk.

CAMBRIDGE, MASS.—The Council has authorized an issue of \$100,000 bridge bonds.

CINCINNATI, OHIO.—The City Engineer is making plans for rebuilding the Liberty street viaduct, which will cost about \$60,000.

COLUMBUS, IND.—Bids will be received at the Auditor's office of Bartholomew County in Columbus, until Aug. 21 for rebuilding a bridge over Sand Creek.

COLUMBUS, OHIO.—It is said that the Pennsylvania R. R. has plans made for a new steel bridge replacing the structure over the Scioto River.

DOWNIEVILLE, CAL.—Bids are wanted Sept. 15 by Henry E. Quigley, Clerk of Board of Supervisors, for a combination bridge with eight piers.

EAST YOUNGSTOWN, OHIO.—It is said that plans are being made by the Pittsburgh & Lake Erie for a large steel bridge to cross the Mahoning Valley Electric road, the Baltimore & Ohio and its own tracks.

EDGELEY, N. DAK.—Bids are wanted until Sept. 9, 2 p.m., by C. J. Allister, County Auditor, for building two bridges.

EVERETT, WASH.—A bridge to have one span about 240 ft. long, and two 125-ft. spans, is proposed by the city, but the location is not decided upon. A. W. Boyle, City Engineer.

FLAMBEAU, S. DAK.—Bids are wanted Sept. 2, for a steel bridge over Big Sioux River. A. J. Vallier, County Auditor.

FORT SCOTT, KAN.—Bids are wanted Aug. 16 for building two 100-ft. steel span truss bridges and a 60-ft. low span truss bridge. Lydia Barton, County Clerk.

GONZALES, TEXAS.—The Commissioners' Court has decided to rebuild the Guadalupe iron bridge. A pontoon bridge will be built across the old Santa Ana ford. J. H. Bootle is a member of the committee on bridge construction.

GRAND RAPIDS, MICH.—A 66-ft. wide concrete, or concrete and steel, bridge has been authorized by the Councils at Bridge street over Grand River. Another bridge is proposed at Wealthy avenue. L. W. Anderson, City Engineer.

HARRISBURG, PA.—The court has confirmed the report of viewers recommending the rebuilding of bridges over Catawissa Creek in Main and Beaver townships, Columbia County, at the expense of the Commonwealth. These bridges were destroyed by the February flood.

KEARNEY, NEB.—Bids are wanted Sept. 9, by the County Clerk of Buffalo County, for building seven bridges. A. V. Offill, Clerk.

LOCKHART, TEXAS.—The Commissioners' Court is preparing to get bids for building iron bridges to replace those recently destroyed.

MAUCH CHUNK, PA.—It is said that bids will soon be wanted by the Carbon County Commissioners for building several stone bridges. Franz Mack is the engineer.

MEMPHIS, MO.—Bids are wanted Aug. 29 and 30 by C. E. Smith, County Bridge Commissioner, for a steel bridge.

MILWAUKEE, WIS.—Mayor Rose has recommended that Jones Island and the mainland be connected by a bridge. Bids are wanted until Sept. 5 by the City Engineer for a bascule bridge.

MONTROSE, PA.—Bids are wanted Aug. 20, at the County Commissioners office, for building a bridge in Lathrop township.

MORRIS, N. Y.—E. F. Musson, of Norwich, N. Y., has made plans for a masonry arch bridge for this town. Address B. D. Phillips, Highway Commissioner.

NASHVILLE, TENN.—Contract for building the masonry work for the Tennessee Central R. R. bridge over Cumberland River has been let to Stewart & Co. (June 20, p. 484.)

NEWPORT, IND.—Bids are wanted Aug. 18, by Wm. P. Bell, County Auditor, for building the superstructure of a bridge over Norton Creek.

NORRISTOWN, PA.—The County Commissioners have decided to erect a bridge over the Perkiomen Creek at a point known as Snyder's mill near Green Lane.

NORTH YAKIMA, WASH.—A steel bridge will be built over the Natchez River two miles from North Yakima.

OAKLAND, CAL.—It is said that the Southern Pacific Co. is surveying a route from Sacramento to Dunbarton Point, and will build a bridge across San Francisco Bay. This route will also necessitate two or three drawbridges, the largest of which will cross the San Joaquin river.

OGDEN, UTAH.—The Mayor has sent a message to the

Council suggesting that a viaduct be built over Twenty-fourth street, where it crosses the railroad tracks. The estimated cost is \$75,000.

PAOLA, KAN.—About \$18,000 worth of bridge work will be done in Miami County this year.

PARKERSBURG, W. VA.—The Parkersburg Bridge & Terminal R. R. Co. has been organized to build a railroad and also bridges over the Ohio and Little Kanawha rivers. J. T. Blair, of Greenville, Pa., is interested.

PHOENIXVILLE, PA.—Town and Pennsylvania R. R. officers have recently visited the site of the proposed bridge over the Frazer Branch at Pennsylvania avenue.

PITTSBURGH, PA.—The West Side Belt R. R. will build a viaduct over the Pittsburgh & Castle Shannon R. R.

PLEASANTON, CAL.—The Board of Supervisors has let the contract for a concrete and steel bridge across the Arroyo del Valle to Cotton Bros. & Co., at \$10,590. (Aug. 1, p. 615.)

PORTEGA-LA-PRARIE, MAN.—A temporary bridge has been built at this place pending the Government's decision about building a permanent structure.

PORTSMOUTH, VA.—The plans for the bridge to be built over Gas House Creek to the Naval Hospital are being made by Fred Thompson. J. J. King is President of the City Council.

SAN JOSE, CAL.—Bids are wanted until Aug. 18 by Henry A. Pfister, Clerk, for a stone and concrete bridge over the Carneadero on the Montgomery road; also for a steel bridge at the same place. (July 25, p. 598.)

SIOUX CITY, IOWA.—Two steel bridges, 24 ft. and 32 ft. wide on concrete foundations, are to be built, according to report, one at Sixteenth street and Geneva, and one at Twenty-fourth street and Geneva. J. M. Lewis, City Engineer.

SOURIS, MAN.—A by-law to raise \$8,000 for a new iron bridge was carried and adopted by the ratepayers.

SOUTH BEND, WASH.—Bids are wanted Aug. 20 for a wooden bridge with a steel draw over Chinook River. J. H. Dalton, Clerk.

STEUBENVILLE, OHIO.—The Commissioners of Jefferson and Harrison Counties will build two bridges on the line separating the counties. One will be near Adena; the other near Unionport.

SUNBURY, PA.—The ordinance for building a subway on Sixth street under the tracks of the Shamokin Valley & Pottsville by the Northern Central R. R., has been signed by Burgess Drumbeller.

SWAMPSOCCOTT, MASS.—It is quite possible that the contract for building the new bridge at this place will be let in the near future. The Commissioners have recently apportioned the cost as follows: Boston & Maine, \$2,155; Essex County, \$3,000; Swampscott, \$701.

SYRACUSE, N. Y.—Bids will probably soon be wanted for the bridge at West Onondaga street, which is to cost \$12,000.

The Delaware, Lackawanna & Western and the city have reached an agreement in regard to the opening of Butternut street and a bridge over Oswego Canal.

WHEELER, S. DAK.—Bids are wanted Sept. 1 by A. Vander Voort, County Auditor, for five combination bridges.

#### Other Structures.

BRADY'S BEND, PA.—The Dewey Iron & Steel Co., of Pittsburgh, has been incorporated in Pennsylvania with a nominal capital. A blast furnace will be built at Brady's Bend.

COLUMBUS, OHIO.—Work on the new additions at the Pennsylvania shops in this city is progressing rapidly and it is said that some of the buildings will be finished by November and all will be in operation by next spring. There is to be a turntable 75 ft. long, operated by electricity. All machinery in the machine shop will be operated by independent electric motor.

CONNELLSVILLE, PA.—It is said that the Pennsylvania is receiving bids for a passenger station at this place to cost \$10,000.

GODERICH, ONT.—Plans have been finished for the new Grand Trunk station at this place.

GUELPH, ONT.—It is said that the Grand Trunk Ry. will build a new station at Guelph Junction.

HAMILTON, OHIO.—The American Frog & Switch Co. has increased its capital from \$125,000 to \$200,000 and will at once build an addition to the present plant, which will double its capacity.

HELENA, MONT.—The Northern Pacific is having plans made for a new station for Helena. Bids will soon be wanted.

KANSAS CITY, MO.—It is said that all the roads except the Burlington have reached an agreement in regard to the new union station, which is to be located at Nineteenth street and Grand avenue.

LOUISVILLE, KY.—The Louisville & Nashville is making plans for the entire reconstruction of its shops in Louisville. The plans are extensive and call for an expenditure of more than \$2,500,000. The location is in South Louisville. There is to be a meeting of the directors in New York probably next week. If the expenditure is then authorized contracts will be shortly let, and the work begun this fall.

MONTREAL, QUE.—The Harbor Board has decided to build a short wharf in front and immediately east and west of the proposed elevator site.

Local reports state that the Canadian Pacific Ry. is now considering bids for building four of the shops at the new location in Montreal.

NEW DECATUR, ALA.—The capacity of the Louisville & Nashville shops here is to be about doubled. Work will soon be begun.

NORRISTOWN, PA.—The Pennsylvania R. R. is about to make improvements here aggregating \$250,000, including a passenger station and double tracking.

PATERSON, N. J.—The brass works of McNab & Harlin Mfg. Co. is to be increased by the addition of two large buildings.

PITTSBURGH, PA.—It is said the Pittsburgh & Lake Erie is receiving bids for station buildings, machine and erecting shop and power station, to be built at McKees Rocks at a cost of about \$250,000.

PORT ARTHUR, ONT.—Plans have been finished for the Canadian Pacific station, which will be 128 x 37 ft.

ROME, GA.—John J. Seay, of this place, is interested in a project to establish a car building plant in this city.

TOLEDO, OHIO.—Pickands-Mather Co. have prepared plans for a steel mill to be built in conjunction with the blast furnace now building in East Toledo.

The Toledo Railways & Light Co. has made public its plans for improvements on Central avenue. It is the intention of the company to at once build car shops and storage sheds which will cost about \$50,000.

WEST SPRINGFIELD, MASS.—Peter Burke, of Springfield, Mass., has the contract for building the new car shops in West Springfield for the New York Central. His bid was \$40,000. The contract calls for a two-story brick building, 240 x 150 ft., to be finished in four months.

#### MEETINGS AND ANNOUNCEMENTS.

*(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)*

#### Car Foremen's Association of Chicago.

A regular meeting of the Car Foremen's Association of Chicago was held in room 209, Masonic Temple, Chicago, Wednesday, Aug. 13, at 8 p.m. The following was the programme: 1. Inspection of cast-iron car wheels in interchange. 2. Air-brake testing plants for terminal yards and charging trains with air. 3. What is the best material for longitudinal sill?

#### Transportation Club of Atlanta.

The Transportation Club of Atlanta has been organized with 125 members from all parts of the South. The officers are: President, Charles E. Harman, General Passenger Agent Western & Atlantic; Vice-President, Sam F. Parrott, Chairman Southeastern Freight Association, and Secretary and Treasurer, F. A. Healey, Auditor Atlanta & West Point. The following were elected as members of the governing board: General Agent J. N. Merrill, of the Burlington; Commercial Agent D. W. Apper, of the Central of Georgia; Commercial Agent Starr Kealhofer, of the Monon; Southeastern Passenger Agent John H. Word, of the Texas & Pacific; Commercial Agent Charles F. Austin, of the Frisco, and City Passenger and Ticket Agent J. B. Heyward, of the Southern.

#### PERSONAL.

The new Superintendent of the Utah Division of the Oregon Short Line, Mr. Horace W. Henderson, was born Aug. 22, 1865. In 1881 he entered the service of the Union Pacific as a shipping clerk in the supply department and occupied several desks, including that of chief clerk, in the same department, until 1886, when he was transferred to the operating department in a similar capacity. Mr. Henderson assumed his new duties Aug. 1, last.

—Mr. M. B. Snow, who recently assumed the Division Superintendent of the Michigan Central at Jackson, Mich., was born in Detroit in 1875. Mr. Snow's whole railroad service has been with this company. Starting as car checker in 1898, he afterward acted as clerk to the Division Superintendent at Chicago. In July, 1900, he went to Victoria on the Canada Division as General Yardmaster and in June the following year was transferred to Detroit as Trainmaster of the East, Toledo & Bay City Divisions. He received his promotion as Division Superintendent on Aug. 1 last.

—Mr. C. H. Ewing, Division Engineer of the Philadelphia & Reading, entered the service of this company in 1883 as a rodman on construction, taking the position of transitman within a few months. For several years he held the position of Assistant Engineer. Mr. Ewing then became Assistant Supervisor, later becoming Supervisor of the New York Division, and after holding that position on a number of divisions he was appointed Division Engineer of the New England Division. In 1893 he was appointed Chief Engineer of the Central New England at Hartford, which position he retained until his recent appointment as above.

—Mr. Grant W. Taylor, who has been connected with the Southern Railway Company for the past 17 years as chief clerk of the Transportation Department, has resigned to accept service with another company. He has been an active member of the Eastern Association of Car Service Officers, and was one of the most earnest supporters of per diem. Mr. Taylor entered railroad service as a telegraph operator in 1873. During the Spanish War movement, which was, of course, heaviest in the South, he was in immediate charge of that business on the Southern Railway, and has been highly complimented both by railroad men and the War Department for the successful handling of the troops and supplies.

—Owing to the absorption of the Burlington, Cedar Rapids & Northern by the Chicago, Rock Island & Pacific, Mr. Frank S. Spafard, formerly Superintendent of the Burlington, Cedar Rapids & Northern, becomes Assistant Superintendent of Telegraph of the Rock Island. Mr. Spafard was born in 1853, and after being educated at the St. Patrick's Academy, La Salle, Ill., entered the service of the Illinois Central as a clerk. From 1869 until 1882, when he went with the Burlington, Cedar Rapids & Northern, he was operator at various points for the Illinois Central. In March, 1883, he became train despatcher at Cedar Rapids for the Burlington, and 10 years later was appointed Superintendent of Telegraph, which position he held until his recent promotion.

—Mr. Hale D. Judson, who succeeded Mr. Rice as Superintendent of the Illinois Lines of the Chicago, Burlington & Quincy, is a native of Wisconsin, having been born at Waupaca in 1853. Mr. Judson entered railroad service in 1873 as a telegraph operator for the Chicago & Iowa at Mt. Morris. In March, 1875, he was promoted to station agent and operator at that point. From Mt. Morris he was transferred to Rochelle as Train Despatcher, and in August, 1885, became General Superintendent. In November, 1890, when the Chicago & Iowa was merged into the Chicago, Burlington & Quincy, Mr. Judson was transferred to Aurora as Superintendent of the Chicago Division, which includes the Chicago & Iowa, and from which position he has just been transferred to the Superintendency of the Illinois Lines.

—The new Engineer of Maintenance of Way of the Chicago, Rock Island & Pacific, Mr. H. F. White, was formerly Chief Engineer of the Burlington, Cedar Rapids & Northern. Mr. White was born in Boston, Mass., in 1851, and entered railroad service at the age of 21 years as Assistant Engineer on the Cairo & Vincennes. In 1873 he went with the Kansas City, Brookfield & Chicago as transitman and in July, that year, was made Resident Engineer. For several months during 1876 Mr. White was Resident Engineer of the Dayton & South-

eastern, but resigned from that position in June to go with the Burlington, Cedar Rapids & Northern as Assistant to the Chief Engineer. From 1877 to 1881 he was Engineer in charge of accounts of road department, and in November, 1881, he assumed the duties of Chief Engineer.

—Senator James McMillan, of Michigan, died Aug. 10 at his summer home at Manchester, Mass. Mr. McMillan was born in Canada in 1838. His father was well-known and was one of the organizers of the Great Western Railway. Young McMillan became purchasing agent of the Detroit, Grand Haven & Milwaukee Railroad while still a very young man and here he attracted the attention of a railroad contractor who employed him, and for several years he was in charge of construction work, but finally returned to his old position with the Detroit & Milwaukee road. In 1864, with several others, he organized the Michigan Car Company and later became president of that concern. From then on he was prominent in manufacturing enterprises and was instrumental in organizing the Detroit Car Wheel Co., Baugh Steam Forge Co. and the Detroit Iron Furnace Co. He also bought and established other car works at various points in the West. In 1880, Mr. McMillan was the chief promoter of the Detroit, Mackinac & Marquette Railway, and later became its President. It was also largely through his influence that the Duluth, South Shore & Atlantic Railroad was built. In 1892 he became Chairman of the board of directors of the Peninsular Car Company of Michigan, which had combined with the Michigan Car Company. Mr. McMillan had the faculty of picking out good men, paying them good salaries and placing them in charge of his affairs. It was probably through this policy that in later years he was obliged to pay little attention to his personal affairs, and he became active and powerful in politics. In the United States Senate he was a member of several important committees.

#### ELECTIONS AND APPOINTMENTS.

*Au Sable & Northwestern.*—William Hunt has been appointed Master Mechanic, with headquarters at Au Sable, Mich., succeeding W. M. Kummer.

*Blackwell, Enid & Southwestern.*—The position of Traffic Manager has been abolished and until further notice correspondence relating to traffic matters should be addressed to A. E. Coleman, Auditor, Vernon, Texas.

*Brunswick & Birmingham.*—H. P. Condit has been elected Secretary, relieving C. J. Bushnell, Treasurer, to this extent. F. B. Chandler has been appointed Auditor, succeeding G. W. Coates, transferred.

*Central of New Jersey.*—F. E. Higbie has been appointed Superintendent of Car Service, with headquarters at Jersey City, N. J., succeeding W. M. Yount, resigned.

*Cerro de Pasco.*—A. E. Welby, heretofore General Superintendent of the Rio Grande Western, has been appointed General Manager of the C. D. P.

*Chicago & Alton.*—W. A. Freese has been appointed Superintendent of Telegraph, succeeding H. V. Miller, who has resigned to devote his time to the development of signaling.

*Cincinnati Northern.*—The position of General Superintendent, formerly held by J. B. Flanders, has been abolished.

*Cleveland, Akron & Columbus.*—B. F. Marshall, Master Mechanic, with headquarters at Mt. Vernon, Ohio, has resigned.

*Coahuila & Pacific.*—A. W. Lilliendahl has been elected President. Mr. Lilliendahl retains also the office of General Manager. J. J. Detwiller becomes Vice-President. The title of J. D. Melville has been changed from Superintendent to General Superintendent.

*Delaware, Lackawanna & Western.*—H. H. Shepard, heretofore Superintendent of the Bangor & Portland Division, has been appointed Superintendent of the Oswego & Syracuse and the Utica Divisions, with headquarters at Syracuse, N. Y., succeeding A. H. Schwarz, resigned. R. Williams succeeds Mr. Shepard at Bangor, Pa., effective Aug. 15.

*Denver & Rio Grande.*—W. J. Griffin has been appointed Assistant Superintendent, with headquarters at Salida, Colo., succeeding John Irwin, resigned.

*Denver, Northwestern & Pacific.*—H. A. Sumner has been appointed Chief Engineer.

*Detroit Southern.*—E. M. Roberts, Superintendent of Motive Power, with headquarters at Springfield, Ohio, has resigned.

*Eastern Texas.*—R. W. Miller has been appointed General Freight and Passenger Agent.

*Erie.*—C. W. Clarke has been appointed General Agent, with headquarters at Pittsburgh, Pa., succeeding S. P. Woodside, who has resigned to go with the Pittsburgh Coal Company.

*Georgetown & Western.*—F. S. Farr, President, will also assume the duties of General Manager. H. M. Sadler, Jr., has been elected Treasurer, with headquarters at New York.

*Great Eastern.*—The officers of this company are: W. L. Green, President; A. A. Wright, First Vice-President; Dr. C. W. Tower, Second Vice-President; J. W. Cook, Treasurer, and J. K. Kollock, Secretary. (See R. R. Construction column.)

*Intercostal.*—N. L. Rand has been appointed Master Mechanic, with headquarters at Moncton, N. B.

*Little Kanawha.*—E. D. Fulton has been elected Secretary.

*Mexican Union.*—H. M. Carothers has been appointed Auditor.

*Missouri Pacific.*—W. L. Kellogg has been appointed Assistant Master Mechanic, with headquarters at Ft. Scott, Kan., succeeding C. A. Sanders, resigned.

*New York, New Haven & Hartford.*—J. E. Fuller, Supervisor, with headquarters at Bridgeport, Conn., has resigned.

*Pacific & Idaho Northern.*—The headquarters of George Pope, Secretary, have been removed from Hartford, Conn., to New York. Lewis Hall has been appointed Assistant Secretary and Assistant Treasurer. H. B. Pierce succeeds Mr. Hall as Treasurer, with headquarters at Indianapolis, Ind.

*Pittsburgh Coal Company.*—S. P. Woodside, heretofore General Agent of the Erie, has been appointed Traffic Manager of the P. C. C.

*St. Louis & San Francisco.*—The headquarters of A. J.

Davidson, General Superintendent, have been removed from St. Louis, Mo., to Springfield, Mo.

*San Pedro, Los Angeles & Salt Lake.*—T. P. Cullen has been appointed Superintendent, with headquarters at Los Angeles, Cal., succeeding A. R. Oster.

*Southern.*—It has been announced that J. N. Seale has been appointed Superintendent of Transportation. M. W. Elliott, heretofore Acting Master Mechanic at Memphis, Tenn., has been appointed Master Mechanic, with headquarters at Tuscumbia, Ala.

*Texarkana & Fort Smith.*—S. R. Knott has been elected President, succeeding J. A. Edson, who becomes Second Vice-President.

*Tombigbee & Northern.*—H. C. Flower has been elected President; J. W. S. Peters, Vice-President, and H. B. Leavens, Secretary and Treasurer.

*Wisconsin Central.*—W. G. Moore, Assistant Treasurer, with headquarters at Milwaukee, Wis., has resigned.

#### RAILROAD CONSTRUCTION.

##### New Incorporations, Surveys, Etc.

**ARIZONA & NEW MEXICO.**—Track laying has been completed on the new line from Lordsburg to Hatchita, N. Mex., 50 miles southeast, and the road is now ready for traffic.

**ARKANSAS SOUTHWESTERN.**—According to most recent reports, a branch 10 miles long is being built from Mill Creek Junction, Ark. J. J. Kress, of Smithton, Ark., is General Manager.

**ATCHISON, TOPEKA & SANTA FE.**—It is said that a branch line 21 miles long will be built from a point on the main line to the Boundary Mining District in Arizona.

**BALD MOUNTAIN.**—Articles of incorporation for this company were filed in Colorado, July 23. The company is formed to build a spur four miles long from the Denver & Rio Grande to a point where coal can be handled from the mines owned by the incorporators. E. W. Redding and E. L. Redding, of Denver, Colo., are interested. The mines are in Huerfano County.

**BESSEMER & LAKE ERIE.**—Surveys are reported completed for a cut-off between Five Points and Osgood, Pa. The cut-off, if built, will be about 20 miles long and will reduce the distance between Pittsburgh and Conneaut, Ohio, about 14 miles, besides eliminating some heavy grades. It is understood that work will begin at once.

**CALIFORNIA ROADS.**—Work is reported begun on a lumber road six miles long, running up Elk River in Humboldt County, Cal., in the interest of the Elk River, Mill & Lumber Co., of which F. W. Pease, of Fortuna, is President.

**CANADIAN PACIFIC.**—Work is reported begun on the laying of 38 miles of track between Toronto and Smith's Falls, Ont., on the Ontario & Quebec Division, with 80-lb. rails.

**CHICAGO, MILWAUKEE & ST. PAUL.**—In regard to frequent press reports that engineering corps were working on a new line to the Pacific coast, an officer writes that he has no knowledge of such surveys being made either at Miles City, Mont., the specified place, or elsewhere west of the Missouri River.

**COAST-KOOTENAY.**—Contract between the Government and McLenn Bros., of Vancouver, B. C., is reported signed for a short line of railroad from the coast to Kootenay. Application to build such a line was made in April, 1901, by Wm. E. Oliver, of Victoria.

**ELLISON & SOUTHERN.**—It is said that work will be begun on another section of this line in Montana, four miles long, to be commenced before the end of August. The line starts at Ellison and has been completed for six miles of the projected distance to the Peerless mines. B. Edgar, of Helena, is General Manager.

**EL PASO & SOUTHWESTERN.**—Contract to build a branch 10 miles long from Fairbanks to Tombstone, Ariz., is reported let to Ormond & Crook.

**GREAT EASTERN.**—Work is now reported in progress on the belt line, 15 miles long, starting from Empire, Ark., and running up Coos Bay to Marshfield, crossing to East Marshfield by drawbridge and continuing to Glasgow and the harbor jetty. L. V. Kinney, of Portland, Ore., is Chief Engineer.

**ILLINOIS CENTRAL.**—It is said that the narrow gage road built for seven miles out of Clarksville, Miss., by the Coahoma Lumber Co. will be rebuilt by the Illinois Central.

**INTERNATIONAL & GREAT NORTHERN.**—Work is reported completed on the short branch line to salt mines near Tucker, Texas.

**IRON RAILWAY.**—Work is now in progress on an extension from a point near Lawrence furnace, Ohio, to Bloom switch, on the Portsmouth branch of the Baltimore & Ohio Southwestern, about 25 miles south of Jackson, Ohio. The maximum grade is 15 ft. per mile; maximum curvature, 6 deg. The length of the extension is 18½ miles, and it is being laid with 70-lb. rail. Gilman, McNeill & Co., Metropolitan Block, Chicago, are the contractors. The work will be completed this year and is in the interest of the Detroit Southern. (Aug. 1, p. 616.)

**KENTUCKY NORTHERN.**—Work has begun on this new railroad from the northeast corner of Estill County, to a connection with the Louisville & Atlantic, affording a connection between the coal and timber lands of the Simcoe Land Company with this railroad at the mouth of Miller's Creek. The distance is 15 miles. Theo. D. Miller, of Detroit, Mich., is President. (June 20, p. 486.)

**KLAMATH LAKE.**—Progress on this new line, which is projected from a point just over the Oregon border near Pokegama, at a connection with the proposed lumber line, to run southwest to Laird's on the Southern Pacific, Cal., is retarded on account of the lack of labor. Grading has been finished as far as a point on Klamath River below Fall Creek, where a steel bridge has been built and rails have been laid for 12 miles from Laird's, or within two miles of the bridge. (Feb. 31, p. 137.)

**KNOXVILLE, LAFOLLETTE & JELlico.**—Contract was let, Aug. 7, to Mason, Hogan & Co., of St. Louis, and to Walton & Co., of Roanoke, Va., for 28 miles of the proposed road between Knoxville and Lafollette, Tenn., leaving only 12 miles yet to be contracted for. The contract now let is for a line from a point at or near Lafollette to Beaver Creek, in Knox County, 12 miles from Knoxville. John B. Newton, General Manager of the

Atlantic, Knoxville & Northern, is President. (July 11, p. 562.)

**KONA-KAU.**—Gardner K. Wilder, Second Vice-President of this company, is quoted as saying that enough capital has been secured in the East to guarantee beginning work within the next two or three months. The line is projected on the west coast of the Island of Hawaii for a distance of about 150 miles. Surveys were reported in January, 1901.

**LUDLOW & SOUTHERN.**—Incorporation has been granted this company in California to build a short road from Ludlow, Cal., on the line of the Santa Fe Pacific, to the Roosevelt mining camp. E. H. Stagg, Walter Rose and others are directors.

**MIDLAND PACIFIC.**—Contracts for the rights of way are reported secured and two preliminary surveys made for this projected road which is to run from Bakersfield, Cal., by way of the Sunset oil district, to a point on the Bay of San Luis Obispo, 140 miles. The promoters wish to raise \$3,000,000 by a bond issue. Mark McDonald, A. Fiest and I. E. Blake are interested.

**NASHVILLE & MISSISSIPPI DELTA.**—According to most recent advices, the Mobile & Ohio has become interested in the building of this projected road from Okolona, Miss., to the border of Calhoun County, a distance of 30 miles, and work will be begun soon. J. W. Buchanan, of Memphis, Tenn., is President.

**NORTHERN PACIFIC.**—It is said that a cut-off 18 miles long will be built from the terminus of the Central Washington at Grand Coulee, Wash., to Adrian, on the Great Northern, work to be begun at once, according to present plans.

**OREGON & PACIFIC.**—Preliminary surveys for this projected line from Crescent City to Grant's Pass are practically completed. About 15 miles of the line south from Grant's Pass, Ore., has been located already and the final location of the entire road should be ready by Oct. 1. The distance will be about 82 miles and there will be four tunnels, the one near the summit being 1,000 ft. long and at an elevation of 1,500 ft. The elevation at the summit is 2,450 ft. The main range of the Siskiyou mountains is crossed near the State line. The route lies through a timber country except for about 20 miles. Actual building will not be begun until the end of the rainy season next spring, although some work may be done on the tunnels before that. Col. T. W. M. Draper, Mills Building, San Francisco, may be addressed.

**OREGON RAILROAD & NAVIGATION.**—Contract is reported let to Wren & Greenough to build this road between Riparia and Lewiston, 71 miles. The contract includes grading and bridging and the estimated cost of the work is about \$800,000. (June 6, p. 422.)

**OREGON SHORT LINE.**—By the new survey of the proposed line between Garfield and Leamington, the new Stockton cut is 38½ miles from Salt Lake City. The length of the cut proper is 3,700 ft.; length of the whole improvement, including the fill at Stockton yard, 6,000 ft.; greatest depth, 98 ft., and greatest width across top, 327 ft. This is said to be the largest cut in the West. Track laying was begun on the new line last July. (March 21, p. 218.)

Improvements to cost about \$21,000 are to be made between the Salt Lake yards and Beck's Hot Springs. A number of small curves will be taken out.

**PARKERSBURG BRIDGE TERMINAL.**—Charter was granted this company at Charleston, W. Va., Aug. 1, to build a railroad in Wood County, W. Va., and in Washington County, Ohio, and to build a bridge across the Ohio and Little Kanawha rivers. The incorporators are J. T. Blair, of Greenville, Pa.; V. B. Ascher, of Parkersburg, W. Va., and others.

**PENNSYLVANIA.**—Sealed proposals for grading about 13 miles for double tracking on the new line for the Cleveland & Pittsburgh, between Hudson and Ravenna, Ohio, were received by Thomas Rodd, Chief Engineer, on Aug. 11.

**RIO GRANDE WESTERN.**—Announcement is made that the company will double-track the line from Soldier Summit to Colton, Utah, a distance of seven miles. This is one of the stretches of heavy grade which will be left in the general reduction of grade and curvature which is taking place between Grand Junction and Ogden, since the country is not adapted for tunnel and the reduction of the grade would require a great increase in the length of the line and in curvature. (Nov. 1, 1901, p. 764.)

**SALT LAKE & BRIGHAM CITY (ELECTRIC).**—A special meeting of the stockholders of this projected line has been called for Aug. 26, when it is proposed to increase the capital stock from \$200,000 to \$1,000,000. Rights of way are reported secured entire between Ogden and Salt Lake, except for one strip about 13 miles long through private lands. The company proposes to commence work soon on an interurban line north from Salt Lake City. J. F. McCarron, of Salt Lake, may be addressed.

**SANDY VALLEY & ELKHORN.**—This company was incorporated at Frankfort, Ky., Aug. 4, to build a railroad 160 miles long from the Kentucky shore of the Ohio River, opposite Ironton, Ohio, to a point near Pound Gap, in Letcher County. The incorporators are Levi C. Goodale, of Cincinnati, Ohio; John F. Hager, of Ashland, Ky., and others.

**SOUTHERN PACIFIC.**—According to most recent reports, track laying on the Ogden-Lucin cut-off continues satisfactorily and a line is now laid between 4,000 and 5,000 ft. out into the lake. The last half mile has been built by making piers with bags of sand.

Contract is reported closed for a branch line from Lake Charles, La., to Lancasine, La. The line, as surveyed, is 25 miles long.

**SPRINGFIELD-WASHINGTON (ELECTRIC).**—Bids are to be asked at once for a line between these points in Illinois, 42 miles, and it is said that work will begin this fall. The route is by way of Clifton and Cedarville.

**SUSQUEHANNA & SOUTHERN.**—Charter was granted this company in Pennsylvania, Aug. 12, to build from a point of connection with the Buffalo & Susquehanna at Sinnemahoning, Cameron County, Pa., to Sykesville, in Jefferson County, Pa., a distance of 65 miles. Marlin E. Olmsted, of Harrisburg, Pa., is President.

**SUSQUEHANNA & TIDE WATER.**—Charter was issued to this company in Pennsylvania, Aug. 11, to build a railroad 30 miles long from a point on the line between Maryland and Pennsylvania, on the west side of the Susquehanna River, thence extending in a northerly direction to a point in the Borough of Wrightsville, all in York County, Pa. M. H. Houseman, of Baltimore, is President.

**TAYLOR PARK.**—According to most recent advices, work will begin within 30 days on this new road, which was

incorporated in Colorado in June, 1901. The line is projected to run from Buena Vista to Aspen, Colo., a distance of about 50 miles. Archibald A. Stewart, 1022 Washington Boulevard, Chicago, may be addressed.

**VALDEZ, COPPER RIVER & YUKON.**—Contract has been let to James P. McDonald, 35 Nassau street, New York, to build this projected line. From Valdez the road will follow the lower river and the Government trail for 100 miles, approaching the Copper River at this point. The entire projected length of the line is 400 miles and it is expected to complete this within 2½ years. Thirty-five miles are to be built this year. The company was incorporated last May. (Official.)

**WABASH.**—In regard to current reports that this company will co-operate with the Grand Trunk in rebuilding the Detroit-Buffalo line, an officer writes that the process of rebuilding has been going on ever since the Wabash began to operate trains between these two points and the whole line is now laid with 80-lb. rail. During this year and the next it is proposed to strengthen and rebuild a number of bridges, of which expense the Wabash will bear its proportion on an agreed basis. The actual work, however, is contracted for by the Grand Trunk and is done under the supervision of its officials, subject to the approval of the Wabash.

**WASHINGTON, NORFOLK & SEABOARD.**—Most recent advices concerning this company, reported in our issue of June 20 as building, say that a mortgage has been filed to secure \$1,500,000 in bonds to be issued for the completion of the road from Point Lookout, in St. Mary's County, to a connection with the Baltimore & Ohio at or near Hyattsville, passing through St. Mary's, Charles and Prince George's counties.

#### GENERAL RAILROAD NEWS.

**ATCHISON, TOPEKA & SANTA FE.**—The three subordinate corporations previously known as the San Francisco & San Joaquin Valley, the Southern California and the Santa Fe Pacific, operating between Mojave and Albuquerque, having been absorbed by the Atchison, Topeka & Santa Fe, which previously controlled them, they will hereafter be known as the Coast Lines of the above, with headquarters at Los Angeles. A. G. Wells is appointed General Manager.

**KETTLE VALLEY LINES.**—Suit has been instituted by County Attorney M. H. Jessup, of Perry County, Wash., acting for the State, to confiscate all the property within the State of the Kettle Valley Lines which run from Grand Forks, B. C., to Republic, Wash., on the ground that a majority of the stock is held by aliens. There are about 40 miles of the road completed within the State.

**LAKE SHORE ELECTRIC.**—Arrangements are reported made to finance this company and relieve the road of a receiver. Bonds are to be issued to the amount of \$6,000,000, two-thirds of which will cover floating indebtedness, underlying bonds and receivers' certificates; \$1,000,000 will be used to complete the road and \$1,000,000 reserved for future uses. The capital stock will also be \$6,000,000, \$4,500,000 of which will be common and the remainder preferred. The Lake Shore Electric is a consolidation of electric lines between Cleveland and Detroit, originally made in the interest of the Everett-Moore Syndicate and authorized by the Secretary of State of Ohio on Sept. 25, 1901. The Lorain & Cleveland; Sandusky & Interurban; Sandusky, Norwalk & Southern; Toledo, Fremont & Norwalk, and Toledo & Detroit traction companies are included. (See Railroad Construction, Oct. 11, 1901, p. 712.)

**PITTSBURGH, SHAWMUT & NORTHERN.**—The New York Railroad Commission, as stated in our issue of Aug. 8, has given its consent to a first mortgage for \$15,000,000. New 50-year 4 per cent. bonds to the extent of \$6,000,000, secured by this mortgage, have been issued in exchange for the old bonds. Of the old bonds, \$184,000 did not come in under the plan and these have received their interest. The remainder of the old bonds have not been cancelled, but are held in trust for such action as the company may see fit to take in the future in the interest of the new bonds.

**ST. LOUIS & SAN FRANCISCO.**—Provided that two-thirds of the capital stock of the Chicago & Eastern Illinois is deposited with the Colonial Trust Co. before Sept. 15, the above company will deliver its stock trust certificates in exchange for the deposited shares as follows: Preferred stock trust certificates will be given in exchange for preferred stock at the rate of 150 of the new for each \$100 share of the old. These are payable in 1942 and will entitle the registered holder to quarterly dividends of 1½ per cent. for each share of preferred stock. Common stock trust certificates, payable in July, 1942, will be exchanged for common stock at the rate of \$250 of the new for each \$100 share of the old. These trust certificates call for semi-annual dividends of 5 per cent. on each share of common stock. To exchange the outstanding share capital as proposed will require the issuing of about \$18,000,000 4 per cent. common stock trust certificates, and about \$10,250,000 4 per cent. preferred stock trust certificates.

**STATEN ISLAND ELECTRIC.**—The properties of this and of the New York & Staten Island Electric Co. were sold at auction on July 6, and bought in for an aggregate of \$260,000 by Wm. L. Bull, chairman of the reorganization committee formed to control both properties. The railroad company operates three trolley lines on Staten Island, and the New York & Staten Island Co. supplies electric light. The properties have been in the hands of John Greenough, receiver, since March 1, and according to the present plan, the two companies will be incorporated on Sept. 1 as the Richmond Light & Railroad Co. (July 18, p. 580.)

**SUSQUEHANNA, BLOOMSBURG & BERWICK.**—See under Wilkesbarre & Western.

**VENTURA & OJAI VALLEY.**—The shareholders will vote Sept. 5 at San Bueno Ventura, Cal., on a proposition to issue \$150,000 5 per cent. gold bonds, to mature on Sept. 5, 1932. The road extends from Ventura to Nordhoff, 16 miles, and was recently reported as purchased from the Southern Pacific Co. by the Wm. R. Statts Co., H. L. Van Schaick and others, of Pasadena; and Geo. C. Power and W. H. Post, of Ventura. An extension from Nordhoff, 10 miles southeasterly to Santa Paula, is said to be contemplated. For further account of the company see our issue of Jan. 10, 1902.

**WILKESBARRE & WESTERN.**—This railroad, which was sold under foreclosure on March 10 to W. J. Turner, chairman of the bondholders' committee, has been reorganized under the name of the Susquehanna, Bloomsburg & Berwick.